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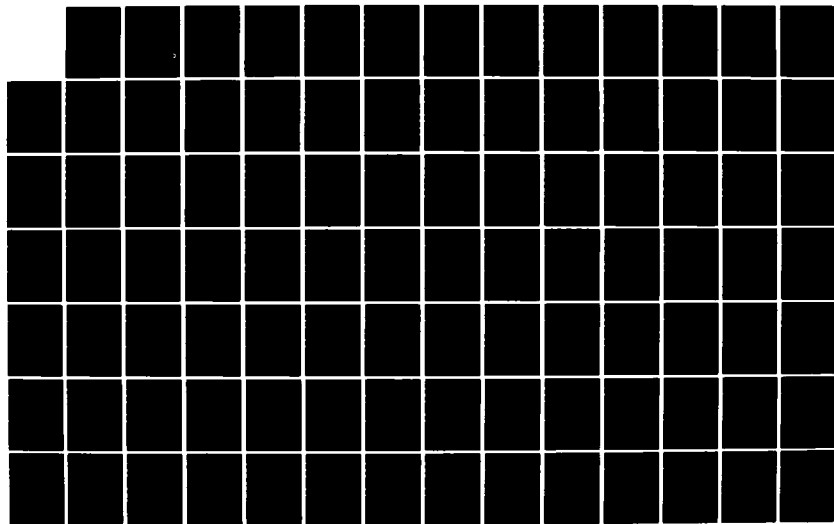
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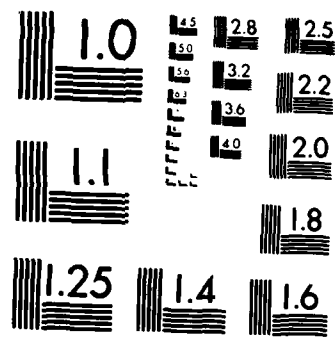
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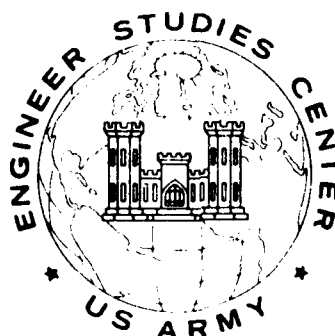
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# THE USACE IN THE MIDDLE EAST-- BENEFITS AND EXPERIENCES FOR FUTURE CONSTRUCTION CHALLENGES

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Prepared by  
Engineer Studies Center  
US Army Corps of Engineers

December 1984

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|---|-----------------------|--|
| 1. REPORT NUMBER  | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER  |
| 4. TITLE (and Subtitle)<br>The USACE in the Middle East--<br>Benefits and Experiences for Future<br>Construction Challenges   |                       | 5. TYPE OF REPORT & PERIOD COVERED<br>Research Report<br>1976-1984   |
| 7. AUTHOR(s)<br>Ms. Jill M. Davis<br>Ms. G. Leslie Geiger<br>Mr. Robert B. Grundborg  |                       | 6. PERFORMING ORG. REPORT NUMBER<br>USAESC-R-84-11                   |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>US Army Engineer Studies Center<br>Casey Building 2594<br>Fort Belvoir, VA 22060-5583  |                       | 8. CONTRACT OR GRANT NUMBER(s)<br>NA                                 |
| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>US Army Engineer Division<br>Middle East, APO NY 09038   |                       | 10. PROGRAM ELEMENT, PROJECT, TASK<br>AREA & WORK UNIT NUMBERS<br>NA |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)   |                       | 12. REPORT DATE<br>December 1984                                     |
|   |                       | 13. NUMBER OF PAGES<br>117   |
|   |                       | 15. SECURITY CLASS. (of this report)<br>UNCLASSIFIED                 |
|   |                       | 15a. DECLASSIFICATION/DOWNGRADING<br>SCHEDULE<br>NA                  |
| 16. DISTRIBUTION STATEMENT (of this Report)<br><br>Approved for public release; distribution unlimited.   |                       |  |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  |                       |  |
| 18. SUPPLEMENTARY NOTES<br><br>DA303973 (Agency Accession No.)  |                       |  |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br><br>engineers                      Third World<br>management                  planning<br>survey                          evaluation.   |                       |  |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br><br>This study is a management analysis of the US Army Corps of Engineers (USACE) involvement in planning, engineering, and construction activities for the Kingdom of Saudi Arabia and other nations in the Middle East. It documents the surveys and interview processes comprising the research phase, details the analysis process, and arrays detailed evaluations of USACE performance. The focus of the analysis is to identify significant lessons learned which would be of concern to USACE planners setting out to conduct future large-scale |                       |  |

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**THE USACE IN THE MIDDLE EAST--**  
**BENEFITS AND EXPERIENCES FOR FUTURE CONSTRUCTION CHALLENGES**

**Prepared by**  
**US Army Engineer Studies Center**  
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**December 1984**

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## ACKNOWLEDGMENTS

The Engineer Studies Center (ESC), US Army Corps of Engineers (USACE), prepared this report under the sponsorship of the Middle East Division, USACE. It was prepared under the overall direction of Mr. Gerard F. Greco (Senior Project Manager) and authored by Ms. Jill M. Davis, Mr. Robert B. Grundborg, and Ms. G. Leslie Geiger.

This report was prepared for publication by Ms. Stacia L. Hall, Miss Donna L. Jones, Miss Anne E. Purcell, and Mr. D. Edward York under the supervision of Ms. Doreen A. Myers. It was edited by Ms. Mary L. Scala. Mr. Christopher K. Lew coordinated the study graphics and printing.

Thanks are extended to current and former MED staff members who participated enthusiastically in the survey and interview processes which comprise the foundation of the study research phase. Messrs. James F. Boyle, Larry Graham, and Merel G. Moody made particularly noteworthy contributions by serving as points of contact for the ESC study team as it proceeded throughout the study duration.

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## ABSTRACT

This study is a management analysis of the US Army Corps of Engineers (USACE) involvement in planning, engineering, and construction activities for the Kingdom of Saudi Arabia and other nations in the Middle East. It documents the surveys and interview processes comprising the research phase, details the analysis process, and arrays detailed evaluations of USACE performance. The focus of the analysis is to identify significant lessons learned which would be of concern to USACE planners setting out to conduct future large-scale construction programs, overseas or in CONUS, where USACE has no existing relationships with the client organization.



## LIST OF ABBREVIATIONS AND ACRONYMS

ADP.....automatic data processing  
AE.....architectural engineering  
APO.....Army Post Office

CBD.....Commerce Business Daily  
CENTCOM.....Central Command  
CONUS.....Continental United States  
CPAF.....Cost Plus Award Fee  
CPO.....Civilian Personnel Office  
CW.....civil works

DA.....Department of the Army  
DGMW.....Director General of Military Works  
DIN.....Deutsch Industrial Number  
DOD.....Department of Defense

EAA.....Engineer Assistance Agreement  
ELC.....Engineer Logistic Command  
EMT-EML.....Environmental Morale Travel-Environmental  
                    Morale Leave  
EPLO.....Engineer Planning and Liaison Office  
ESC.....Engineer Studies Center

(F).....Forward  
F&A.....finance and accounting  
FMS.....Foreign Military Sales  
FSI.....Foreign Service Institute

GDMW.....General Directorate of Military Works  
GFP.....Government Furnished Property

KKMC.....King Khalid Military City

MC.....military construction  
MCA.....Military Construction, Army  
MCAF.....Military Construction, Air Force  
MED.....Middle East Division  
MILCON.....Military Construction  
MODA.....Ministry of Defense and Aviation  
MOPTT.....Ministry of Postal, Telephone, and Telegraph  
MOU.....Memorandum of Understanding

OAS.....Office of Administrative Services  
OCE.....Office of the Chief of Engineers  
O&M.....operation and maintenance  
OPD.....Ordnance Program Directorate  
OPM.....Office of Personnel Management

PAO.....Public Affairs Office(r)  
P&S.....procurement and supply  
PTT.....postal, telephone, and telegraph  
PX.....post exchange

(R).....Rear  
RFP.....request for proposal  
RMO.....Resource Management Office

S&A.....support and administration  
S.A.M.E.....Society of American Military Engineers  
SES.....Senior Executive Service  
SOGS.....Saudi Oriented Guide Specifications  
SOP.....standing operating procedures

TCN.....third-country national  
TDY.....temporary duty

USACE.....United States Army Corps of Engineers

## THE USACE IN THE MIDDLE EAST--

### BENEFITS AND EXPERIENCES FOR FUTURE CONSTRUCTION CHALLENGES

1. Purpose. This paper documents the results of a management analysis of the US Army Corps of Engineers (USACE) involvement in the planning, engineering, and construction activities for the Kingdom of Saudi Arabia and other nations in the Middle East. The analysis is based mainly on information gathered through a survey of and interviews with program participants. It assesses USACE performance in the program and develops and shares lessons learned as a result of that involvement. The primary focus is to isolate and document those major lessons learned that might be helpful to future program planners and decisionmakers who are charged with preparing other foreign programs.

2. Background. The most intense and recent round of planning, engineering, and construction in the Middle East began gaining momentum in 1973. The USACE organization with responsibility in the Middle East at that time was the Mediterranean Division, headquartered in Livorno, Italy. An operating district in Saudi Arabia was in charge of construction management, but the division at Livorno took care of the administrative work and engineering design. In the summer of 1976, the Mediterranean Division was abolished and the Middle East Division (MED) was established with headquarters in Riyadh, Saudi Arabia.<sup>1</sup>

a. The MED was itself split into two entities--MED Forward (F) which was responsible for construction management and liaison with the Saudi

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<sup>1</sup>Department of the Army, US Army Corps of Engineers, Office of the Chief, Historical Division, Middle East Division: The Corps of Engineers in Saudi Arabia, presentation by John T. Greenwood, Fort Belvoir, Virginia, 6 May 1983 (hereafter referred to as The Corps in Saudi Arabia).

Government and MED Rear (R) which was located in Berryville, Virginia and was responsible for master planning and design activities.

b. Annual USACE construction placement in Saudi has steadily increased from \$15 million in 1973 to \$1.8 billion in 1983. The number of USACE employees in Saudi has increased during these same years from 83 to 1275.<sup>2</sup>

c. With the reduction in oil revenues over recent years, the Saudi Government has cut back on many of its planned programs. USACE has also assisted in training a cadre of Saudi engineering personnel to assume Corps functions. Thus, the Saudi program is winding down and can be expected to terminate within the next 3 to 4 years. MED also administered construction in other Middle East countries, but on a much smaller scale. Much of this work was Military Construction, Air Force (MCAF) funded construction done for Central Command (CENTCOM).

d. BG George R. Robertson, former Commander, MED, asked that the Engineer Studies Center (ESC) conduct a management analysis of MED activities from a "lessons learned" perspective. He wanted the research conducted while key knowledgeable personnel were still available and their memories were fresh. He encouraged ESC to take a broad-brush approach and pursue those issues which promise to recur or which should be considered before embarking on future large-scale programs remote from existing organizational relationships or construction supporting infrastructures.

### 3. Study Scope.

a. Although the USACE involvement in Saudi Arabia began more than 30 years ago, ESC's management analysis focused on events transpiring over the last 8 years--since 1976.

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<sup>2</sup>The Corps in Saudi Arabia.



b. ESC studied the Saudi Arabian construction program as well as construction programs for other Middle Eastern countries. Most of the information gathered and analyses conducted address the Saudi experience; however, great pains were taken to collect and isolate information which pertains to other Middle East work. The information was collected, sorted, and analyzed to isolate special issues and lessons learned. This paper summarizes the study's general findings; more definitive study findings are presented in the supporting annexes.

c. This lessons learned study is a management analysis and thus does not address the technical and structural quality of the construction placed by USACE. It addresses only management matters of interest to USACE planners setting out to conduct future large-scale construction programs overseas or in CONUS where USACE has no existing relationships with the client agency.

4. Study Process. This management analysis was conceived as a simple three-phase project: research, analysis, synthesis. The ESC team which conducted this study consisted of two analysts and a project manager. The project manager worked with the MED point of contact (POC) to develop a purpose and scope for the analysis. Once this was done, a study plan was prepared and submitted in October 1983. The study plan was approved with only minor revision in scope (i.e., COL Claude D. Boyd III, former Deputy Commander, MED (R), recommended that the project scope include not only Saudi, but all Middle East construction programs).

a. ESC analysts interviewed the MED POC and Dr. John Greenwood of the Historical Division, Office of the Chief of Engineers (OCE) about the history of the Saudi Arabian and Middle Eastern construction programs. Based on those interviews and a review of pertinent reference documents, the ESC

team outlined an ambitious research effort. They decided to collect information using a two-pronged approach--survey and interview. The concept was to develop some baseline statistics through the survey process and then to conduct extensive structured interviews to gain insights on those statistics. The key to making this process work is that the survey and interview processes had to be compatible; i.e., address corresponding subject matter from both the quantitative and qualitative points of view. The data sought and collected focused on management issues. Because the study team members were not personally involved with the MED's programs, the data base they designed and developed was one founded on the premise that the program participants knew enough about the program's successes and failures to be helpful and that they were willing to share their insights.

b. The ESC research phase took from late November 1983 through early May 1984. A survey was distributed to a stratified sample of about 250 MED (F) and MED (R) employees in December. Some 125 responded--a very favorable response rate since survey participation was voluntary and since many of the MED (F) staff were on leave during that period. A second survey mailing (65 more) was prepared in February, based on recommendations gathered from participants in the first mailing. This second mailing was directed toward "former" program personnel who were no longer on the MED staff. Responses to the second mailing were then added to those from the first, so the survey data would reflect program evaluations by both current and former USACE employees. Annex A details the survey process and results.

c. The interview portion of the research phase was designed to amplify on the survey statistics. It was conducted after the first survey results were in and simultaneously with the second survey round. The ESC

study team, working with MED management, developed an initial interview list of key individuals with relevant experience. That list was continually revised and expanded throughout the interview process. Ultimately, the team spoke with 95 MED (F) and MED (R) employees and knowledgeable OCE staff members. This information was supplemented by transcripts of interviews previously conducted by the Historical Division, and by narrative input to the survey which was transferred to an automated narrative data base file being created to help sort the information the team would gather during the interview process. In all, the opinions and experiences of 264 USACE employees past and present (including all Commanders of the MED) were input to ESC's automated data retrieval and sort file. By this means, the study team was able to greatly expedite its analysis phase.

d. The analysis phase extended from May through June 1984 and was simultaneously interrupted and enhanced by the necessity to brief the study while it was still in process. On 11 May 1984, the Commander's Conference received a 10-minute preview of study findings and usage. On 25 June 1984, the OCE staff was briefed on the study process, results, and utility. Both forums allowed the study team to share information about, evoke interest in, and receive reactions to its findings.

e. The synthesis phase took most of the months of June and July and consisted of sorting through the separate lessons learned issues to develop a broader overview. The results of this process were the Checklist of Considerations for New Project Planning and a synthesized list of major lessons learned.

5. Analysis. At the outset of the project, the research universe was carved up into 21 separate categories of information (see Figure 1). Data

## TWENTY-ONE RESEARCH CATEGORIES

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### Technical

Level, Duration, Condition of Personnel Assignments

Organizational Structure

Physical Location of Organizational Elements

Cost Management (Financial Management, Finance and Accounting (F&A), Cost Control)

Management Control Structure

Quality Control

Contract Type, Contractor Selection, Contract Negotiation

Project Materials (Construction Material, Communication Equipment)

Safety Program

Security and Sensitivity

Engineer Assistance Agreement (EAA)

Working and Living Conditions

Management of Government Furnished Property (GFP)

Communications (Work-Related and Personal)

Planning

Engineer Design

Construction Management (In-House and Contract)

Other (Culture)

### General

Career Development

Organizational Vitality and Responsiveness

National Interests

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Figure 1

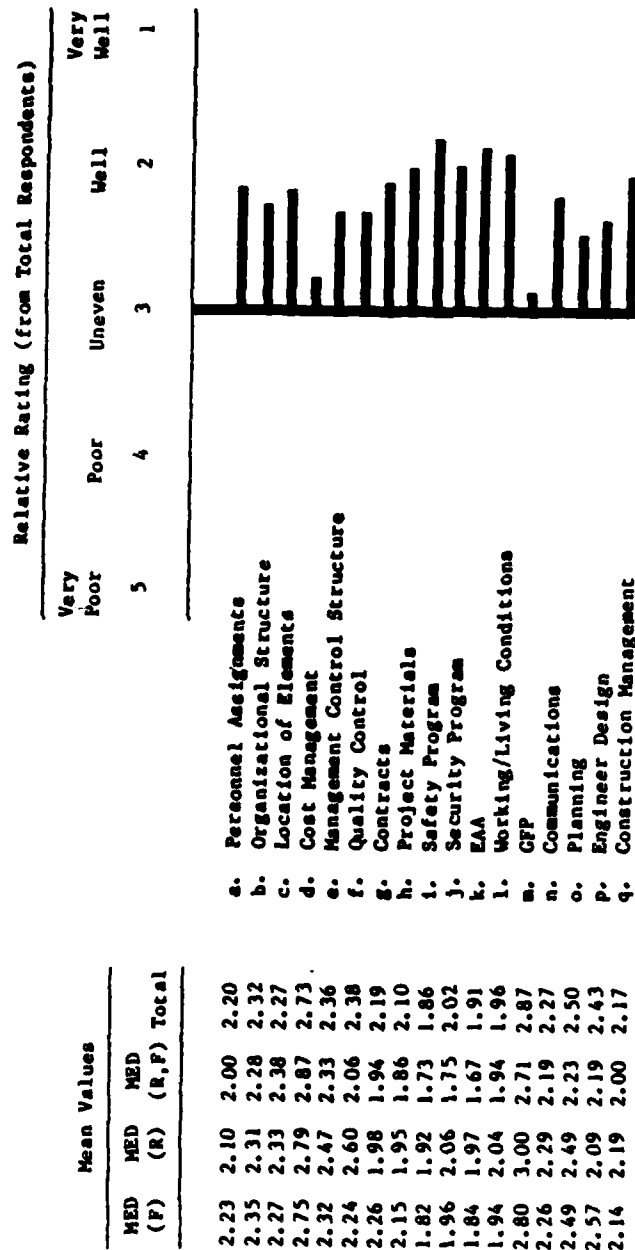
were collected, stored, retrieved, and subsequently analyzed in accordance with these 21 categories. In addition to isolating items of information in these discrete groupings, the team asked the interview respondents to indicate whether their comments were based on experience in Saudi Arabia or in some other Middle Eastern country. The analysis, therefore, makes some accommodation for the fact that the situations varied dramatically among the countries of the Middle East due to type construction, funding, and political and cultural considerations.

a. Survey results. ESC's survey process is discussed in detail in Annex A. The most outstanding results from analyzing these responses are discussed briefly below.

(1) Figure 2 summarizes those survey results pertaining to the technical research categories listed in Figure 1. On the most obvious level, it appears that Middle East program participants viewed the USACE technical performance in a positive light. All mean responses are plotted on the positive side of rating #3--the so-so response. When comparing these responses among themselves, it becomes apparent that the most positive responses pertain to those aspects of the experience which reflect on creature comforts and personal safety and security (safety program, EAA, and working and living conditions). The poorest responses related to areas where USACE probably would prefer to see outstanding results: The management of GFP, cost management, and planning.

(2) Figure 3 includes some of the more interesting responses to the general survey questions which measured opinions in three general categories: career development, organizational vitality, and national interests. These statistics represent overwhelmingly enthusiastic evaluations of program

# SUMMARY OF SURVEY RESULTS--17 TECHNICAL CATEGORIES



- Rating Scale:**
- 1 - USACE addressed this aspect of the program very well given the situation, adjusted appropriately, and need not look back except to boast.
  - 2 - USACE handled this aspect of the program adequately given the situation, learned from its mistakes and successes, and needs to focus on lessons learned and benefits gained.
  - 3 - USACE performed unevenly in this area, should review selected aspects of this program area.
  - 4 - USACE dealt poorly with this aspect of the program, should review its experience, and take firm measures to preclude repeating these errors.
  - 5 - USACE performed very poorly in this area and should avoid similar large-scale programs because the problems are overwhelming.

Figure 2

performance and value. The most positive responses were given to those questions which asked participants to evaluate the impact of the program on their individual careers and capabilities and on the organization's capability and reputation.

**SELECTED SURVEY RESPONSES**  
(General Categories)

| Response   | Percent |
|--|---------|
| Enhance Professional and Technical Experience                                      | 78.2    |
| Strong Benefit to Career   | 17.3    |
| Some Benefit to Career   | 33.3    |
| Some Benefit/Some Hindrance  | 17.0    |
| Very Beneficial to Future Large-Scale USACE Programs                               | 69.1    |
| Some Adverse Effects   | 1.8     |
| Maintains Relevant Technical Experience  | 64.0    |
| Promotes USACE Reputation in Professional Architectural Engineering (AE) Community | 51.2    |
| Promotes Organizational Flexibility of Work Process                                | 50.0    |
| Enhances Mobilization Readiness  | 50.0    |

Figure 3

(3) The selected responses listed in Figure 3 paint a rather rosey picture of the MED construction program. It is with very high marks that program participants evaluate the experience and its impact on individuals and organizations involved. Obviously, the MED employees believe their personal capabilities improved as a result of the experience (78.2 percent of respondents) as did the USACE capability as an organization (64 percent). The study team took great pains to mix possible positive and negative responses and to provide equal numbers of opportunities for positive and negative evaluations. Therefore, the many positive and few negative comments were a

surprising result (e.g., placed me at the end of the line for advancement--6.7 percent; placed me in a dead end career path--6.7 percent; provided experience irrelevant to career progress--14.5 percent; some hindrance to career--0.6 percent; some adverse effects to future large-scale USACE programs--1.8 percent; and degraded USACE reputation by requiring work in areas not USACE strong points--7.9 percent).

(4) The overall positive evaluation which this survey implies is further supported by the amount of information volunteered by survey respondents. A very high number of individuals replied to the "other" option provided at the end of each question. More than 27 percent of respondents voluntarily amplified on Questions 6 and 9. A startling 34 percent (57 respondents) wrote detailed explanations of the numerical ratings they selected when answering Question 10. This active participation in the survey process has prompted ESC to add extra credence to the positive survey results. The fact that respondents took the time to suggest 65 former MED employees for a follow-up survey also is a persuasive indicator of the enthusiasm and pride of the average MED employee.

(5) The statistics cited above comprise the results of ESC's first research phase. They served as a baseline. They indicate that program participants disagree very little in their overall evaluation of the MED program. The interview phase which followed constituted a more in-depth, focused pursuit of information, opinions, and issues relevant to the current Middle East construction program and possibly useful in preparing guidelines for similar efforts.

b. Interview results. The ESC interview process is discussed in detail in Annex B; complete interview results are presented in Annex C and



Annex D. Specifically, the research category results have been packaged according to each of the 21 categories (Figure 1). Annex C contains an organized array of issues identified within each of the 21 categories, along with the lessons learned that correspond to each of these categories. That presentation of results is complete, useful for reference purposes, and does not distinguish between major and minor issues and lessons learned. We have left that distinction to be discussed here in the main portion of the report (paragraph 6 below). Whereas Annex C presents the interview results according to research categories, Annex D presents much of that same information in another format--one that can be more easily used as a reference by program planners. The checklist in Annex D includes only the study's major lessons learned and those issues which support those major lessons; it is organized in a utilitarian format and is oriented to a timeframe of interest and program phases--rather than research categories.

(1) There are 81 lessons learned included in the checklist at Annex D. This is somewhat fewer than the number cited in the category-by-category listings given in Annex C. Still, 81 lessons learned are too many to prompt insightful discussion. Therefore, Figure 4 lists the 12 most significant lessons learned.

(2) Not surprisingly, most of the major lessons learned which were revealed during ESC's interviews--and corroborated through the survey statistics--dealt with the earliest planning stages of the program. It is only logical to expect that the better and more detailed the program planning, the more efficient and effective the program and project execution. Most of those surveyed or interviewed made specific recommendations on how program planning could be improved. Those decisions made early on are the ones that

## KEY LESSONS LEARNED

---

Organize early for total program.

Use team of experienced planners.

Start lean.

Secure knowledge of country and job sites.

Set up flexible organization.

Avoid duplicating functions.

Consolidate support.

Look hard at incentives--they are hard to take away.

Establish planning team to set up program organization, procedures, policies, and to clarify country-to-country relationships and program scope.

Plan and staff early for financial management, project tracking, and funding.

Keep at least an Engineering Division Technical Team near construction sites.

Split division appropriate early on, but consolidation to rear should have been earlier.

Limit accompanied tours to top-level managers involved in long-term, harsh environment programs.

Provide adequate communication capability.

Thoroughly investigate geologic and environmental conditions.

Investigate availability and capability to deliver materials and parts--plan for contingencies.

Emphasize standardized design of component elements and entire units.

Use Cost Plus Award Fee (CPAF) contracts only where project is not well defined, a staff is available to monitor closely, and someone is familiar with them.

Put enough construction management people in the field to oversee the job--make sure they are capable.

---

Figure 4

must be lived with, paid for, replaced, or reinforced throughout the duration of the program. These key lessons learned and their accompanying rationales are discussed in the following paragraph.

6. Key Lessons Learned.

a. Organize early for total program: Use a team of experienced planners, start lean, get knowledge of country and sites, set up flexible organization, organize for mission--not careers, avoid duplication of functions, consolidate support, look hard at incentives--they are hard to take away. This first item is a mouthful. The issue is really one of proceeding cautiously and in detail to avoid establishing unnecessary organizations and employee benefits which would inevitably cost greatly. The specific interview comments which substantiate this finding are as follows: "Too many different organizations (division, district, Engineer Planning and Liaison Office (EPLO)) in one place; too many organizational layers; too much management; not enough field personnel; staff redundancies; too many employees in MED (F); division with two to three districts worked well; area and resident offices worked well; duplicate functions of MED (F) and district; no authority in field, fragmented functional responsibilities; and no planned organizational structure for phase-down." These directly related comments are supplemented by those comments which address high USACE support and administration (S&A) costs, and by those survey statistics which indicate that USACE performed most poorly in the areas of cost management, planning, and GFP management. Management of GFP influenced both project costs and organizational structure. The issue of employee incentives is key. Incentives are expensive to fund, hard to take away once granted, and may not really contribute to program effectiveness or efficiency in the long run.

b. Establish a planning team to set up program organization, procedures, policies, and to clarify country-to-country relationships and program scope. This finding reiterates the sense of paragraph 6a--that planning is important, but it goes one step further. It addresses the actual process by which more effective planning may be pursued. MG Wells appointed a planning committee at the initiation of the Saudi Arabian construction program. But, he indicated in his interview for this study that the committee had not worked out well for some unknown reason, possibly personality conflicts.<sup>3</sup> The fact that this planning group was not successful does not and should not preclude future program planners from trying to capitalize on the combined knowledge of experienced professionals from a broad range of backgrounds within USACE, and from any other agencies or governments that would be appropriate. Many of the problems which were identified during the interviews could be traced to the early stages of the program, where program and project scope were nebulous and where USACE had little related experience. Some of the detailed interview comments which support this perspective are: "The plan for project planning, when followed, gave MED elements an excellent coordinated plan for designing and constructing projects; logistics is critical--must be planned in detail from the outset; MED did not do a great deal of planning--it had no 5-year or 10-year plan." These comments are only a few of those which overflow from other topics to support this finding. Many of the comments which relate to the host nation or client's inability to define the program early are equally true of project planning. Clients need to be involved in the initial stages of project planning in order to hold down change orders. In overseas

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<sup>3</sup>MG Richard Wells, interview with ESC analysts, Washington, D. C., March 1984.

programs, the customer and construction managers need to clarify their ground rules early. Along these lines, many positive comments endorsed the effectiveness of the EAA. Evidently, USACE did such a fine job establishing its country-to-country agreement early that it should serve as a model for getting a program off on the right foot, establishing clear responsibilities and expectations, and providing appropriate protection for USACE employees working in a remote and unfamiliar cultural environment.

c. Plan and staff early for financial management, project tracking, and funding. As stated earlier, there has been a great deal of concern about the high costs associated with the Saudi Arabian construction program. The comments made during the interviews indicated that USACE was too late in defining the project and in establishing economy controls, a financial management system, and manpower controls (e.g., consolidation and use of TDY to meet manpower shortfalls). Respondents also gave examples of poor cost estimates (especially early on), the cost benefits to be gained from leasing some types of property rather than buying, and of how difficult it is to separate overhead costs from project costs. Along these same lines, some individuals challenged the propriety of including claims adjustments or services to other agencies or governments within the S&A accounting classification. The logic of handling S&A as a percentage of placement was even challenged as being similar to the rationale that led to abuse of the CPAF contracts (i.e., the higher the cost, the greater the profit). As with the lesson learned discussed in paragraph 6b, this focus on early planning should help prevent embarrassingly high-cost USACE construction overseas.

d. Keep at least an Engineering Division Technical Team near construction sites. One of the earliest decisions made about the Saudi Arabian

construction program was that which called for putting the construction management and Saudi liaison elements in Saudi Arabia while locating the engineering element in Berryville, Virginia, and assigning the master planning and design activities. The rationale behind this decision was complex: the Saudis requested US designs; the best AE firms were located in CONUS; it would benefit the US balance of trade to have US firms involved in this monumental program; and it was too far from CONUS AE firms to the Middle East to justify locating the USACE engineering element forward--as had been the case when the program was small and headquartered out of Livorno, Italy. Once the program was in full swing, problems developed due to the distance between the Engineering Division and Construction Division. The interview participants indicated that MED's Construction Division could not always determine the intent of design, and could not easily or quickly clarify their design problems. This problem occurred despite 1976 formation of the EPLO--an engineering element forward--to preclude such problems. In the early 80s (1981 to 1982), MED decentralized and split up EPLO into three elements, locating them at Al Batin and Riyadh District Offices as well as the Division Office in Riyadh. This more decentralized arrangement seems to have worked fairly well and probably should have occurred earlier. Most concerned personnel indorsed this as a desirable arrangement for future overseas programs. One alternative recommendation along these same lines is to have a representative of the AE design contractor (under supervision of the Engineering Division) on site to answer design questions or resolve design problems.

e. The split division was appropriate early in the program, but could have been consolidated to the rear earlier. The issue of having forward and rear divisional elements has been controversial throughout the program's

duration. After reviewing the program's history and interviewing program participants, it became apparent that there were strong reasons for locating the engineering elements in the rear to handle master planning and design activities. It also became evident that the construction management and client liaison functions could be handled more efficiently from closer to the work sites. Thus, the split division developed. Once the program matured and the administrative and support functions became routine and automated, it was time to conduct these functions from a more cost-effective location--MED (R). A many-phased internal reorganization plan revealed that MED had for some time been in a position where it could begin to bring its administrative and support functions back to the CONUS division location. Once this consolidation got underway, it was viewed by MED employees as being not only appropriate, but overdue. BG George Robertson also indicated in his interview with the ESC study team that this "bringing back the flag" was overdue.<sup>4</sup> He emphasized that he believes the MED organization and staff are at a point in their experience where future overseas programs could be managed from CONUS, with area offices (districts at most) handling the actual construction program. Other key individuals involved throughout the program echoed these opinions. Along these same lines, good communications networks and use of TDY by appropriate experts were recommended as ways of making up for the great distances involved. This lesson learned would not be complete without mention of the fact that the MED command would have been rotated back to CONUS at least a year earlier had it not been for political pressures by the Saudis to keep the flag forward as long as possible, keeping their access to the Commander and his staff a much easier proposition.

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<sup>4</sup>MG George R. Robertson, interview with ESC analysts, Riyadh, Saudi Arabia, February 1984.

f. Limit accompanied tours to top-level managers involved in long-term, harsh environment programs. The terms of such assignments must be defined up front. They affect recruiting, program costs, program quality (as influenced by staff continuity), and employee morale. Most managers that ESC interviewed agreed that the Saudi Arabian program permitted too many accompanied tours. They said that although this arrangement contributed to program continuity, it had driven S&A costs to unacceptable limits, and to a certain extent had contributed to too many employees becoming entrenched in their positions and being reluctant to return to their stateside home bases. The lessons learned in Saudi Arabia have prompted MED to staff much differently for programs in other Middle East countries. Employees in the Civilian Personnel Office (CPO) indicate that the more austere staffing policy has made recruiting more difficult, but that ultimately the Oman program was fully and adequately staffed to do the job with only a barest minimum of accompanied tours--four. In this case, the learning from the Saudi experience has already become institutionalized within the MED. Commanding Officers and top managers were adamant, however, in recommending that some accompanied tours were essential for proper quality control and project continuity for programs where USACE must operate in remote and harsh environment locales. There seems to be widespread agreement that only top-level civilian managers (GM-14 and above) should be allowed accompanied tours.

g. Provide adequate communication capability. Adequate communications equipment is often taken for granted in CONUS and in other industrialized nations. Therefore, planners might easily overlook its importance. But, based on the evolution of the communications capability in Saudi Arabia and on similar experience in Oman, it appears that this fundamental capability must



be created early in a program: include technical communications experts early on in planning to determine the best systems; have users define their communications needs considering mission needs, equipment costs, and host-country constraints; make sure host-country agreements include approvals for communications and issuance of licenses and frequencies before starting a project; standardize communications network elements to be compatible with existing systems to ensure availability of parts and dedicated maintenance personnel.

(1) The communications capability between MED (R) and MED (F) was definitely inadequate when the Saudi program began. After four satellite lines were leased (one data-only, one voice-only, two voice-and-data), the situation improved dramatically. Saudi program efficiency improved further as ADP equipment and a net of low- and high-speed facsimile transmitters joined the communications network. Of course, there still are problems. The EAA authorized MED and contractors to establish intrasite and intersite radio nets and required the host government to provide frequencies. Initially, the Saudis had no central agency to control and allocate frequencies. When the Ministry of Postal, Telephone, and Telegraph (MOPTT) assumed this responsibility, they would not approve frequencies for MED. The General Directorate of Military Works (GDMW) has acted on none of MED's formal requests (1980, 1981, and 1983) for authorization per the EAA. The Saudis are fully aware of MED's unauthorized systems, but have not interfered with them. They are viewed as a means of command and control, which in the wrong hands could constitute a real threat to their government. Failure to legalize the radio systems leaves the Saudis a perceived capability to quickly shut them down without MED recourse. Despite the increased commercial telephone service since 1976, there still remains a requirement for MED to operate radio communications,

especially for emergency operations, to preclude MED sites being isolated due to failure or cutting of all telephone service. Construction efficiency, safety, and costs are also affected by the availability or nonavailability of radio communications between work sites and area and resident offices. A MED-owned and maintained microwave system in Riyadh enables MED to compensate for insufficient telephone cable and to be independent of local conditions.

(2) In Oman, commercial telephone lines are being used because program traffic does not justify the expense of dedicated lines for high-frequency voice and record traffic. Thus, each call is very costly. Although USACE employees in Oman need more commercial lines at area offices, the postal, telephone, and telegraph (PTT) infrastructure cannot provide them. This communication problem in Oman is complicated by the lack of an Army Post Office (APO). Thus, mail must be sent through the diplomatic pouch and might take 2 to 4 weeks.

(3) Because of the primitive state of communications at the outset of the Saudi program, the communication network had to evolve--going through several phases to get to an adequate level. Apparently, the situation in Oman is similar, although the program size and duration may not justify the development of a communications network anything like the sophisticated one that exists today in Saudi Arabia.

h. Thoroughly investigate geological and environmental conditions. This project planning step is one that apparently received too little emphasis throughout the Saudi construction program. The results were cracked foundations, settling roads, broken pipes, and corroded equipment. USACE employees at both MED (R) and MED (F) said new programs should require more extensive geological investigation and soil testing than was used in Saudi. This is an

essential area of focus for USACE, because technical competence and professional reputation are at risk when these issues are overlooked, especially with the client who must absorb the cost of repairing the failed structures. Among other comments on this point are: "Corps lacked thorough geological investigation and soil testing techniques (compaction qualities, water, salt and clay content, etc.); materials used in CONUS are not necessarily satisfactory for the Middle East; and many materials and designs not suited to this area."

1. Investigate availability and delivery capability of materials and parts; plan for contingencies. This lesson is closely related to the one at paragraph 6b. Unavailability of materials and parts can stop a construction project. Construction programs at remote sites where there are no local materials or parts must deal with product availability during the early planning phase. When asked about project materials, the following comments were the most frequent: "Lack of emphasis on standardization causes construction, repair, and operating problems; there were delays in obtaining materials due to delays inherent in using products and materials produced in the US; USACE involvement in GFP caused problems with project costs as well as scheduling, ordering, checking, storing, and tracking; the philosophy of "buy Saudi" was at first unrealistic from a cost standpoint and later from a delay standpoint; ports were clogged months before ships off-loaded; deliveries were hard to schedule; spare parts were not stocked in country; many "Saudi" products were not local, but merely purchased through Saudi middlemen and therefore were shipped from all over the world; US standards were used in contracts when not necessary--need a system to cross reference US standards to international standards on international contracts." These issues may seem petty, but if

they are not dealt with at program outset, they can become major problems. The "Buy US" concept or "Buy locally" approach may lock USACE into an unacceptable procurement problem if not thoroughly researched at the start of planning. Today, it appears that there are tremendous problems in Saudi with the operations and maintenance (O&M) aspects of completed construction projects, as well as with administration of USACE program and project functions. There are severe problems with repair capability for office equipment, availability of paper and consumable office supplies, and availability of spare parts for equipment with predictable maintenance requirements (e.g., computer equipment, copy machines, communications equipment (radios), and air conditioners). Parts availability and delivery capability are not only influenced by project and program planning, they are also affected by those portions of the country-to-country agreement that pertain to product acquisition and procurement. Parts availability and delivery capability also influence the type construction contracts that are most appropriate for the project. The customer needs to be educated about the need for an O&M organization that can accept the completed project. The construction contractor needs to be required to provide an adequate supply of spare parts. Such actions should help relieve USACE of the necessity to deal with these lingering and inevitable O&M problems which are associated with construction programs.

j. Emphasize standardized design of component elements and entire units (e.g., pre-cast panels and housing units). This is an area where project planning, engineering, and construction processes come together to cost or save significant amounts of money. As mentioned in paragraph 6i, this topic surfaced as a result of the interview question on project materials.

Construction Division employees reiterated the point that USACE did not emphasize standardization and that more than 1700 different shapes of architectural concrete were allowed when only 100 to 200 would have sufficed. Somewhere along the line, AE design contractors were not reminded to seek standardization. This led to entirely too many unique designs, which then led to too many different requirements for variety in product conformation. As a result, despite the high cost of change orders, it is more likely that there will be more change orders--there being more unique designs to approve and change. Installing, inspecting, repairing, and operating a variety of pumps or fire alarm systems at one site is obviously unnecessarily expensive and complex. At any rate, standardization is always cost-effective, and (since overseas programs can be expected to be extremely expensive) standardization in overseas construction can result in great economies.

k. Use CPAF contracts only where the project is not well defined, staff is available to monitor closely, and someone is familiar with them. Because the topic of contracts received a lot of attention from interview subjects, the ESC team thought it appropriate to identify at least one major lesson learned that deals with contracts. The interview discussions on contract form, type, and selection uncovered a litany of shortcomings and possible improvements. But, it seems that the single most intriguing aspect of this question is the CPAF contract. The case of the CPAF contract at King Khalid Military City (KKMC) at Al Batin came under discussion at every turn. Most personnel commenting on this subject indicated that the CPAF contract was the proper approach for the KKMC project. Project definition was relatively nebulous, and there was no infrastructure in place on which to base a project start. USACE shortcut the construction gear-up time by negotiating a CPAF

contract which required the contractor to put in the basic utilities, road network, and construction base camp. The tragic flaws in this arrangement were that USACE had no experience with monitoring this type contract and did not have enough staff in place to do the monitoring--even if they had known what to watch. The result was embarrassing cost overruns, embarrassing overbuilding, and extravagant workers' benefits in order to justify larger award fees. The bottom line, therefore, is that USACE learned to stick with its preferred type of contract (fixed fee) even where it may not be most appropriate for the job. CPAF still seems most appropriate for KKMC-type projects, and USACE should be prepared in the future to hire experienced contracting officers or to allocate sufficient resources to contract monitoring so that they can identify reasonable cost thresholds, procurement practices, and design standards.

1. Put enough construction management people in the field to oversee the job--make sure they are capable. Throughout the interview phase, construction and quality assurance personnel stated that there were not enough personnel in the field, and that too many employees were allocated to paper management. They cited their overtime figures and the high turnover of contract management personnel as proof of understaffing. Other frequent comments on this topic were: "No overlap of personnel assignments to provide project continuity; construction personnel had insufficient skills in foundations and geotechnical areas (as stated in paragraph 6h); construction management involved putting out too many fires and thus was labor intensive; and, there were no detailed sets of SOPs outlining contract managers' responsibilities for each field office position." All of this adds up to just reiterating the point that since USACE is a construction management organization, it must do

its utmost to deliver a quality product. The matter of sufficient resource allocation is fundamental to an effective program. If organized properly for maximum efficiency (as emphasized in the first two key lessons learned), then USACE should incur less redundancy, reorganization, and waste. This capability gained by operating more efficiently could then be programmed for allocation in the field. This lesson learned is also related to the high-cost issue. By providing high-quality professional construction management, quality assurance should be more effective, project costs should be less, and project timeliness should improve significantly.

7. Additional Insights.

a. The 12 key lessons learned listed in Figure 4 only scratch the surface of the experience USACE gained as a result of the Middle East construction program. Other highlights of the information gathered and insights gained are catalogued in Annex C--according to the 21 research categories outlined in Figure 1.

b. For a more detailed presentation of these same insights with supporting/related issues, see Annex D, "Checklist of Considerations for New Project Planning." It is organized according to topics of interest to future program planners or decisionmakers who wish to quickly review the experiences and learning that have resulted from the Middle East construction program. Specifically, the three summary categories of lessons learned are: project planning, management-related and customer-related program planning, and construction activity. In all, 81 lessons learned are spread among these three categories and each has its own set of supporting issues. Within each summary category of lessons learned, the items are listed from top to bottom according to when in the progress of a program they would be expected to be of interest.

Thus, the program planning comments would tend to cluster at the top of this checklist while project planning comments would cluster in the midrange, and construction activities would tend to follow last.

8. Summary.

a. When ESC embarked on this lessons learned study, the study team expected that there would be very few lessons learned of interest to future construction managers in similar programs. That was certainly not the case. In fact, the study evolved into something far more extensive and rigorous than anticipated. This was at least in part due to the high degree of enthusiasm expressed by the interview and survey respondents.<sup>5</sup> It was also, in part, due to the study team's enthusiasm, which grew in relation to the successes of the research effort--the extensive and willing input by program participants fueled the study's progress.

b. This lessons learned study, like that of the Near East Project Office,<sup>6</sup> focused on the successes and shortfalls of an important USACE construction program. Although MG Wall spoke from firsthand experience, and ESC spoke from an artificial experience created by pooling the extensively detailed comments and impressions of 240 program participants, the two studies reached remarkably similar conclusions.

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<sup>5</sup>Because the interview respondents' comments were so thoughtful and detailed, the study team transcribed this narrative data and produced an enormous computer printout containing all comments to all questions. This material, without respondents' names associated to their input, will be given to the OCE Historical Division so that it can be studied or referenced by anyone interested in the problems and challenges experienced in this large-scale remote construction program. ESC will also give the Historical Division the four interview transcripts from the current and past MED commanders.

<sup>6</sup>Department of the Army, US Army Corps of Engineers, Near East Project Office, USACE, Lessons Learned in Israeli Air Base Program, by MG John F. Wall, Commander; Tel Aviv, Israel, September 1982.



c. USACE learned a lot from the MED program. At first glance, it may appear that overall the lessons learned were negative, focusing on problems and showing a need for improvement. Fortunately, though, USACE learned many of its lessons early and responded quickly to correct its deficiencies and improve its performance. In Saudi Arabia, USACE turned many of these early mistakes into successes, improving its organization, financial tracking system, and management processes as the program matured and improved over time. It also transferred this learning experience into programs in other Middle East countries where its operations were adjusted accordingly. It was the individuals who participated in this program that made it a very successful and positive experience. As they indicated in their survey responses, they have served a very valuable apprenticeship and are now ready to manage other large-scale, remote projects (either abroad or in CONUS) with confidence. USACE can be proud of its efforts, and--in having met the challenge successfully--has improved its overall organizational vitality as a result.

ANNEX A

SURVEY RESPONSES AND RESULTS

## ANNEX A

### SURVEY RESPONSES AND RESULTS

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1. Introduction. Because the ESC management analysis of the Middle East construction program was addressing a very recent subject which has been changing rapidly, it was necessary to create an organized and relevant data base. The first step in creating such a store of information was to conduct a survey to establish baseline data and to thereby help focus the remainder of the research effort. The ESC survey, which kicked off the full-scale research phase, was designed to be used in conjunction with an extensive series of interviews. The surveys were intended to serve as a springboard for the interviews to help direct questions. After the interview process was completed, the survey results helped keep the interview comments in perspective

relative to all responses on that topic. Thus, the survey results helped verify and corroborate interview data. The survey forms were designed to be used by current and past employees of MED--both (F) and (R). This gave the study team a picture of USACE's work throughout its recent involvement in Saudi Arabia and other Middle East countries.

2. Description. The survey form (see Figure A-1) had 10 questions relating to the respondent's tour of duty and one additional question soliciting names of past employees who had worked with MED (See Figure A-1). The 10 core questions were designed to elicit responses on the USACE performance from two perspectives--its impact on the organization and the individual.

a. Questions 1 through 5 contained header information and were concerned with length, time, and place(s) of tour in Saudi Arabia/other Middle East countries, the start and end grade, and the organizational element(s) of assignment.

b. Question 6 provided a mixed selection of both positive and negative descriptions of the USACE involvement in the Middle East. Respondents were asked to pick the ones most appropriate and/or specify others not listed. Question 7 sought to identify how the respondent felt about the benefit of this program to future large-scale USACE programs.

c. Questions 8 and 9 concerned the effect of the MED experience on the respondent's career. The respondent was asked to rate the career effects from "strong benefit" to "strong hindrance" and was given statements to select from and mark, further detailing the effect on career development.

d. Question 10 contained a list of 17 technical categories for evaluation. The respondent was asked to rate USACE's performance in these categories in Saudi Arabia and the other Middle East countries, and to make

SURVEY OF CURRENT/PAST MED EMPLOYEES

1. Length & time of tour with MED (R) 19 \_\_\_\_\_ (F) 19 \_\_\_\_\_.
2. Length & time of assignment in Saudi 19 \_\_\_\_\_.
3. Length of assignment in other Middle East countries (Egypt, Oman, Jordan...) 19 \_\_\_\_\_.
4. Grade level at time of Saudi/MED experience \_\_\_\_\_ Current grade \_\_\_\_\_.
5. MED organizational element of assignment (Engr, Const, EPLO, RMO...):  
\_\_\_\_\_
6. Please circle the appropriate statements below that you feel best describe the USACE involvement in construction programs in the Middle East. NOTE: You may choose as many of the following statements as you consider applicable.
  - a. Promotes organizational vitality.
  - b. Personnel who went overseas did not represent the best within the organization.
  - c. Location too distant to allow tight control of quality and costs.
  - d. Enhances mobilization readiness.
  - e. Maintains relevant technical expertise.
  - f. Promotes organizational flexibility of work process.
  - g. Too much responsibility without corresponding authority vis-a-vis host nation.
  - h. Degraded USACE professional reputation by requiring work in areas that were not USACE strong points.
  - i. Experience too dissimilar to likely new opportunities to provide transferable skills/work processes.
  - j. Promotes USACE reputation in professional A-E community.
  - k. Other (specify): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Generally, do you consider the USACE Middle East construction activity a benefit to future large-scale USACE programs?
  - (a) Very beneficial
  - (b) Some benefit
  - (c) No relationship
  - (d) Some adverse effects
  - (e) Significant adverse effects

Figure A-1 (Continued on Next Page)

SURVEY OF CURRENT/PAST MED EMPLOYEES--Continued

8. How do you think the USACE Middle East construction activity has affected your career?
- (a) Strong benefit (b) Some benefit (c) Some benefits and some hindrance  
(d) Some hindrance (e) Strong hindrance
9. Please check the appropriate statements that best justify your response to question #8.
- a. Punched a critical career ticket.  
b. Placed me at the end of the line for advancement.  
c. Enhanced professional/technical experience.  
d. Provided experience irrelevant to career progress.  
e. Provided monetary benefits.  
f. Cost me money to participate.  
g. Provided travel opportunities not available in prior assignments.  
h. Provided contacts with individuals who helped or might help my career.  
i. Helped me make a desired career path change.  
j. Placed me in a dead end career path.  
k. Other (specify)... \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
10. If your experience equipped you to evaluate some of the following aspects of USACE program involvement in the Middle East, please rate those aspects according to the scale (A-E) as defined below. Also indicate if your rating applies to Saudi-only or other Middle East programs, and put a check mark wherever you wish to make further comments on continuation pages.
- A = USACE addressed this aspect of the program very well given the situation, adjusted appropriately, and need not look back unless to boast.
- B = USACE handled this aspect of the program adequately given the situation, learned from its mistakes and successes, and needs to focus on lessons learned and benefits gained.
- C = USACE performed unevenly in this area, should review selected aspects of this program area (this survey invites suggestions on continuation page).
- D = USACE dealt poorly with this aspect of the program, should review its experience and take firm measures to preclude repeating these errors.
- E = USACE performed very poorly in this area and should avoid similar large scale programs because the problems are overwhelming.

Figure A-1 (Continued on Next Page)

SURVEY OF CURRENT/PAST MED EMPLOYEES--Continued

|  | Rating<br>(A-E) | Saudi | Other<br>MED | MED<br>(R) | Comment<br>Attached |
|--|-----------------|-------|--------------|------------|---------------------|
| a. Level, Duration, Condition of Personnel Assignments       |                 |       |              |            |                     |
| b. Organizational Structure                                  |                 |       |              |            |                     |
| c. Physical Location of Organizational Elements              |                 |       |              |            |                     |
| d. Cost Management (Financial Mgt, F&A, Cost Control)        |                 |       |              |            |                     |
| e. Management Control Structure                              |                 |       |              |            |                     |
| f. Quality Control   |                 |       |              |            |                     |
| g. Contract Type, Contractor Selection, Contract Negotiation |                 |       |              |            |                     |
| h. Project Materials (Const Matl, Commo Equip)               |                 |       |              |            |                     |
| i. Safety Program  |                 |       |              |            |                     |
| j. Security Program  |                 |       |              |            |                     |
| k. Engineer Assistance Agreements                            |                 |       |              |            |                     |
| l. Working Conditions/Living Conditions                      |                 |       |              |            |                     |
| m. Management of Government Furnished Property               |                 |       |              |            |                     |
| n. Communications (Work Related & Personal)                  |                 |       |              |            |                     |
| o. Planning  |                 |       |              |            |                     |
| p. Engineer Design   |                 |       |              |            |                     |
| q. Construction Management<br>In-house<br>Contract           |                 |       |              |            |                     |
| r. Other (specify)   |                 |       |              |            |                     |

SURVEY OF CURRENT/PAST MED EMPLOYEES--Continued

11. Please enter suggestions of prior MED employees or officers who are no longer with MED and who might be willing to participate in this survey.

Name \_\_\_\_\_

Current Address \_\_\_\_\_

Prior Assignment w/MED \_\_\_\_\_

Figure A-1



further narrative comments on any of the categories that would amplify on the rating. These 17 technical categories were used as the foundation for the interview phase of this project.

3. Process. Before the actual survey process began, the study team discussed the desired level of survey participation. The team agreed that 5 percent of current MED employees would comprise an acceptable minimum response. For greater statistical reliability, the goal was set at 10 percent participation because of the complexity of the questionnaire and the variability of responses anticipated. The survey process was then carried out in two stages and, because of time constraints, the first group of questionnaires were mailed during the Christmas season of 1983 when nearly 50 percent of the MED staff was on leave. This first group was the larger of the two mailings and was performed by the MED CPO. The CPO distributed 250 survey forms throughout the organizational elements and within the range of grades both (F) and (R). The goal was a representative, stratified sample of current MED employee opinions. Exactly 50 percent were returned in usable form. As these were returned, the study team compiled the responses to question 11 and used this as the basis for another iteration of the survey. Question 11 had asked respondents to provide names and addresses of previous MED employees. This list of previous MED employees yielded some 65 names and some 40 responses. In total, there were 165 usable returned questionnaires. These data were compiled and entered into the computer for analysis.

4. General Questionnaire Results. The MED participation in the survey was at the preferred 10 percent for the total possible staff. (The return from the first mailing was actually higher than should be expected, considering that only one-half of the MED staff was available to respond to the

questionnaires.) In general, the respondents had a very positive attitude about the USACE involvement in the Middle East. They felt that the experience was good for the organization, that it would prepare the organization for future large-scale programs, and that the people who participated in the program also benefitted in a career and personal sense. When rating specific aspects of the program, the respondents felt that USACE performed well in the program. Even though some areas were ranked relatively weaker than others (e.g., cost management, GFP, planning, and engineer design were the lowest ranking categories), it was apparent that performance in these lower ranking areas improved later in the program.

5. Specific Questionnaire Results.

a. Questions 1 through 5 solicited demographic information from the respondent.

(1) Figure A-2 is a summary of questions 1 and 2 and shows the time of the 165 respondents' tours with MED (F) or (R), or both, by time periods (prior to 1980, or 1980 to 1984, or both). Each cell shows the frequency and percentage of respondents at the indicated time and place; for example, 68 (41.2 percent) respondents had a tour with MED (F) after 1980, 37 (22.4 percent) had a tour with MED (R), which spanned the years before and after 1980. (A respondent could have had multiple tours of which one may have been in MED (F) prior to 1980, and MED (R) before and after 1980, etc.) Only 13 (7.9 percent) of the respondents had tours of duty in other Middle East countries (question 3). Because this number is too small to be statistically reliable, no further analysis was made of the results for this question.

(2) Figure A-3 shows the results of question 4. The respondents generally moved to a higher pay grade by the end of their tour with MED, but

TIME PERIOD AND LOCATION OF RESPONDENTS' TOURS WITH MED

|               | Location                     |                           | Total     |
|---------------|------------------------------|---------------------------|-----------|
|               | Forward Area<br>(Percentage) | Rear Area<br>(Percentage) |           |
| Prior to 1980 | 21 (12.7)                    | 8 (4.8)                   | 29 (17.5) |
| 1980 to 1984  | 68 (41.2)                    | 19 (11.5)                 | 87 (52.7) |
| Both*         | <u>41 (24.8)</u>             | <u>37 (22.4)</u>          | 78 (47.2) |
| Total**       | 130 (78.7)                   | 64 (38.7)                 |           |

\* Respondents whose tour(s) spanned before and after 1980.

\*\* This figure shows 194 respondents rather than 165, because some employees had multiple tours which fell in separate locations and time periods.

Figure A-2

FREQUENCY DISTRIBUTION OF RESPONDENTS' GRADES

|                    | Starting<br>Grade | Current<br>Grade |
|--------------------|-------------------|------------------|
| No Grade indicated | 2                 | 1                |
| GS-2               | 1                 | 0                |
| GS-3               | 7                 | 0                |
| GS-4               | 2                 | 4                |
| GS-5               | 7                 | 5                |
| GS-6               | 2                 | 3                |
| GS-7               | 7                 | 5                |
| GS-8               | 3                 | 2                |
| GS-9               | 5                 | 5                |
| GS-10              | 0                 | 1                |
| GS-11              | 16                | 9                |
| CPT or GS-12       | 51                | 48               |
| MAJ or GS/GM-13    | 39                | 40               |
| LTC or GS/GM-14    | 18                | 29               |
| COL or GS/GM-15    | 5                 | 12               |
| SES                | 0                 | 1                |
| Total              | <u>165</u>        | <u>165</u>       |
| Average Grade      | GS-11             | GS-12            |

Figure A-3

this trend was not as pronounced as it was for the interviewed personnel. However, many respondents were no longer with MED, and on their return to CONUS had taken a downgrade. Their lower grade was then used as their "current" grade. Had the grade at the end of their MED tour been used instead, Figure A-3 would show a shift to a higher grade similar to that for the interviewed personnel.

(3) Figure A-4 shows the organizational element(s) to which the respondents were assigned during their tour with MED. The first column shows the assignments of all 165 respondents. However, some respondents worked for two and even three organizational elements during their tour with MED, and this is reflected in the second and third columns.

b. Question 6 asked the respondent to select as many of the given statements that would "best describe the USACE involvement in construction in the Middle East." Figure A-5 shows the frequency (by percentage) of responses for each statement. Half of the survey form statements were purposefully designed to allow positive comments about the USACE involvement and half to allow negative comments. They were also scrambled to avoid survey bias. Four of the five positive choices were selected by 50 percent or greater of the respondents (the fifth was selected by 46 percent). Hence, over 50 percent thought that this program helped promote organizational flexibility and reputation, enhance mobilization readiness, and maintain technical expertise. Of the five negative statements, none had a frequency of response greater than 37 percent, and only three had 20 to 37 percent responses--personnel in MED were not USACE's best (36.6 percent); location too far away to tightly control quality and costs (20.1 percent); and too much responsibility without corresponding authority (19.5 percent).

| ORGANIZATIONAL ASSIGNMENTS OF DEPENDENTS |                       |           |           |
|--|-----------------------|-----------|-----------|
| Organizational Element                   | Number of Assignments |           |           |
|  | 1                     | 2         | 3         |
| Administration                           | 2                     | --        | --        |
| ADP                                      | 5                     | 1         | --        |
| Comptroller                              | 5                     | --        | --        |
| Construction                             | 67                    | 8         | --        |
| Counsel                                  | 5                     | --        | --        |
| Engineer Logistics Command               | 4                     | 1         | --        |
| Engineer Planning and Liaison Office     | 7                     | 1         | --        |
| Engineering                              | 40                    | --        | --        |
| Executive                                | 2                     | --        | --        |
| Office of Administrative Services        | 4                     | 2         | --        |
| Office, Chief of Engineers               | 0                     | --        | --        |
| Operations                               | 0                     | --        | --        |
| Ordnance Program Division                | 2                     | --        | --        |
| Personnel                                | 3                     | --        | --        |
| Planning                                 | 0                     | --        | --        |
| Procurement                              | 13                    | --        | --        |
| Real Estate                              | 0                     | 1         | --        |
| Safety                                   | 3                     | --        | 4         |
| Unknown                                  | <u>3</u>              | <u>--</u> | <u>--</u> |
| Total                                    | 165                   | 14        | 4         |

Figure A-4

# QUESTION 6

| Frequency<br>(Percentage) | Question  |
|---------------------------|---|
|                           | Statements that best describe USACE involvement in construction programs in the Middle East:            |
| 46.3                      | A. Promotes organizational vitality.  |
| 36.6                      | B. Personnel who went overseas did not represent the best within the organization.                      |
| 20.1                      | C. Location too distant to allow tight control of quality and costs.                                    |
| 50.0                      | D. Enhances mobilization readiness.   |
| 64.0                      | E. Maintains relevant technical expertise.  |
| 50.0                      | F. Promotes organizational flexibility of work process.   |
| 19.5                      | G. Too much responsibility without corresponding authority vis-a-vis host country.                      |
| 7.9                       | H. Degraded USACE professional reputation by requiring work in areas that were not USACE strong points. |
| 4.9                       | I. Experience too dissimilar to likely new opportunities to provide transferable skills/work processes. |
| 51.2                      | J. Promotes USACE reputation in professional AE community.  |
| 28.7                      | K. Other...   |

Figure A-5

c. Question 7 asked the respondent to consider how the USACE Middle East construction activity might be a benefit to any future large-scale USACE programs. The respondents could choose five statements from "very beneficial" to "significant adverse effects" (see Figure A-6). Ninety-eight percent of the respondents felt the program had some benefit or was very beneficial. Only 1.8 percent of the respondents felt the construction activity had some adverse effects and none thought there were significant adverse effects.

d. Questions 8 and 9 concern career development.

(1) Question 8 asks how the experience affected the respondent's career--from "strong benefit" to "strong hindrance." Figure A-7 shows that over 80 percent of the respondents felt the program had "strong" or "some" benefit, while less than 20 percent felt that the activity had some hindrance or a combination of benefits and hindrances.

(2) Question 9 provided 10 statements (positive and negative) to justify the response to Question 8 and an "other" line for additional comments. Figure A-8 shows that the three most frequently chosen answers were positive statements and showed that the majority of the respondents felt the program enhanced their professional/technical experience (78 percent), provided travel opportunities (68 percent), and/or monetary benefits (65 percent). The "other" line prompted responses from 46 (27.9 percent) of the respondents. There were no comments repeated frequently enough to be statistically significant, but most were positive, a few were on similar topics, some diametrically opposed, and many were issues reported during the interview process. Their relevance was further substantiated in the issue summaries that evolved during the analysis of the interview data. Figure A-9 shows some of these "other" responses.

### QUESTION 7

| Frequency<br>(Percentage) | Question   |
|---------------------------|--|
|                           | Generally, do you consider the USACE Middle East construction activity a benefit to future large-scale USACE programs? |
| 69.1                      | A. Very beneficial   |
| 29.1                      | B. Some benefit  |
| 0                         | C. No relationship   |
| 1.8                       | D. Some adverse effects  |
| 0                         | E. Significant adverse effects   |

Figure A-6

### QUESTION 8

| Frequency<br>(Percentage) | Question   |
|---------------------------|--|
|                           | How do you think the USACE Middle East construction activity has affected your career? |
| 47.3                      | A. Strong benefit  |
| 33.3                      | B. Some benefit  |
| 17.0                      | C. Some benefits and some hindrance  |
| 0.6                       | D. Some hindrance  |
| 0                         | E. Strong hindrance  |

Figure A-7



# QUESTION 9

| Frequency<br>(Percentage) | Question  |
|---------------------------|---|
|                           | Please check the appropriate statements that best justify<br>your response to question 8. |
| 17.6                      | A. Punched a critical career ticket.  |
| 6.7                       | B. Place me at the end of the line for advancement.                                       |
| 78.2                      | C. Enhanced professional/technical experience.  |
| 14.5                      | D. Provided experience irrelevant to career progress.                                     |
| 64.8                      | E. Provided monetary benefits.  |
| 1.8                       | F. Cost me money to participate.  |
| 68.5                      | G. Provided travel opportunities not available in<br>prior assignments.                   |
| 45.5                      | H. Provided contacts with individuals who helped or might<br>help my career.              |
| 26.7                      | I. Helped me make a desired career path change.   |
| 6.7                       | J. Placed me in a dead end career path.   |
| 27.9                      | K. Other....  |

Figure A-8

# "OTHER" RESPONSES TO QUESTION 9

| Pros  | Cons   |
|---|--|
| Provided promotional and career-related training opportunities.   | Narrowed career path.  |
| Provided experience and opportunities for advancement which would have taken years longer to realize in state-side job. | Fell behind in state-of-the-art technical experience.                    |
| Opportunity to work as supervisor of engineers of varied disciplines.   | Job announcements for CONUS jobs received in Saudi after closure date.   |
| Broadened possible areas of assignment.   | Out of mainstream for management positions when away from home district. |
| Provided opportunity to work with engineers and technicians of different nationalities and cultures.                    | Lost reemployment rights.  |
| Provided opportunity to become familiar with European codes, standards, and construction methods.                       | Placed me at a responsible position without authority.                   |
| Information gained can be directly applied to home district.  | No way for local hire to advance.  |
| Provided opportunity to be closer to field activities after years of office management.                                 |  |
| Provided opportunity to be part of a great construction group that is helping to build a nation.                        |  |

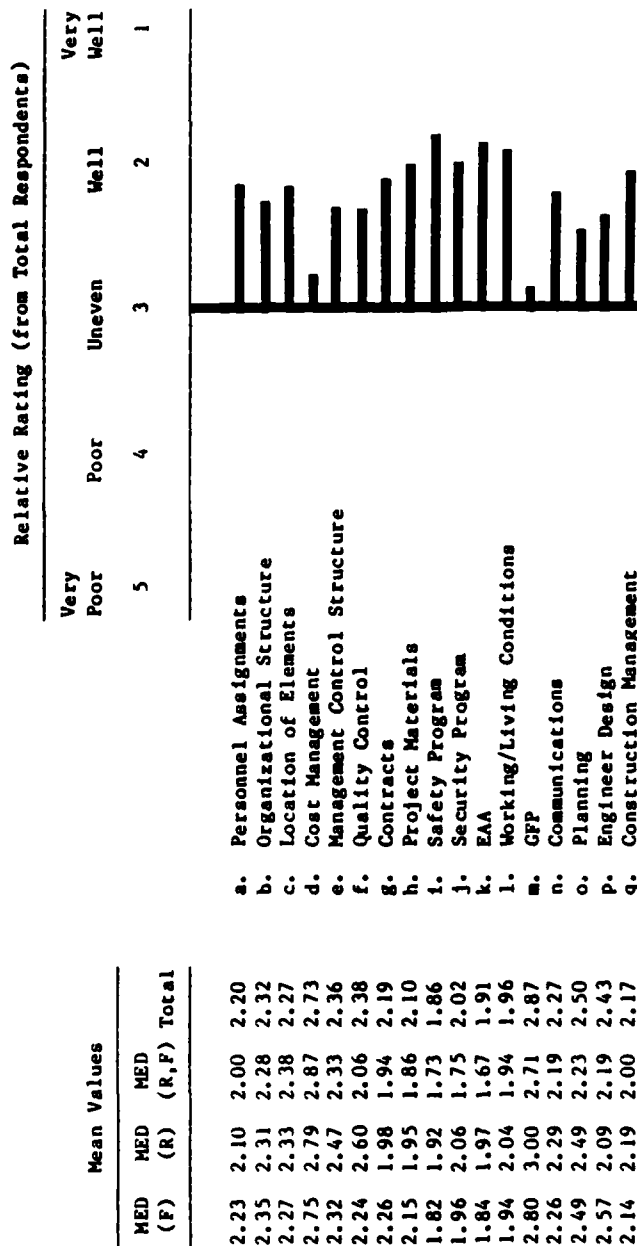
Figure A-9

e. Question 10 provided the list of 17 technical categories and asked the respondent to rate how well USACE performed in these areas in Saudi Arabia and other Middle East countries (MED (F)), and at Berryville, Virginia (MED (R)).

(1) The left side of Figure A-10 has four columns listing the mean values for respondents who worked in MED (F), MED (R), MED (F) and (R), and total respondents. (Note that within each of these organizational breakdowns none of the mean values falls below a number three rating.) All the respondents generally agreed on the performance ratings. However, people who worked in both the forward and rear areas generally tended to rate USACE's performance lower than those who worked in one area or the other. Also, in quality control and engineer design, there was a large difference in ratings between the (F) and (R) elements. As perhaps expected, MED (F) respondents rated their work on quality control higher than the MED (R) respondents and, conversely, MED (R) respondents felt they did a much better job on engineer design than the MED (F) respondents.

(2) The right side of the figure is a diagram of the ratings found in the total column. Fourteen of these categories received ratings between 3 (uneven) and 2 (well), and three categories received ratings between 2 (well) and 1 (very well). The safety program, EAA, and working/living conditions are where USACE did its best work overall. The program received its poorest ratings in the areas of cost management, GFP, planning, and engineer design. It is significant here that these areas are the ones in which an organization with USACE's experience might wish to have performed especially well--thus are areas which USACE should emphasize in future large-scale projects.

# SUMMARY OF SURVEY RESULTS--17 TECHNICAL CATEGORIES



Rating Scale: 1 - USACE addressed this aspect of the program very well given the situation, adjusted appropriately, and need not look back except to boast.  
 2 - USACE handled this aspect of the program adequately given the situation, learned from its mistakes and successes, and needs to focus on lessons learned and benefits gained.  
 3 - USACE performed unevenly in this area, should review selected aspects of this program area.  
 4 - USACE dealt poorly with this aspect of the program, should review its experience, and take firm measures to preclude repeating these errors.  
 5 - USACE performed very poorly in this area and should avoid similar large-scale programs because the problems are overwhelming.

Figure A-10

(3) In addition to these numerical ratings, the respondents were encouraged to provide further narrative comments to any of the 17 technical categories. Of the 165 usable responses, 57 (34.5 percent) contained narrative that was of such detail that it was transcribed and included in the interview data. The type and detail of this narrative material varied from a one-sentence comment on one category to several pages of narrative addressing nearly all 17 categories.

ANNEX B

INTERVIEW PROCESS

## ANNEX B

### INTERVIEW PROCESS

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| 2                | Background--Need for Interview Process               | B-1         |
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1. Purpose. This annex describes the process used to collect, sort, analyze, and synthesize narrative interview data and produce a summary of issues used as the basis for the Checklist of Considerations for New Project Planning (see Annex D). It also includes a list of participants who contributed to this interview process.

2. Background--Need for Interview Process. While the results of the survey form serve as baseline data for this study, the information is very general and offers little insight into the specific issues. The interview process was designed to complement the survey data and was selected as the optimum means to provide greater insight into the issues, forming the basis of the final checklist.

### 3. Interview Process--Data Collection.

a. The ESC study team coordinated extensively with executive and other key personnel in MED in selecting individuals to be interviewed. Initially, 63 people were selected, but by the end of the interview process, a total of 94 were actually interviewed by ESC analysts. An additional seven interview transcripts were selected from Dr. John Greenwood's recent file of interviews of key MED personnel in Saudi Arabia. These transcripts were highly relevant to the issues identified during the study. Several survey forms, which were completed by MED personnel and returned to the ESC study team, included additional comments, explanations, or other insightful narrative data. Of these, 57 contained significant data which were then synthesized by ESC analysts into artificial or dummy interviews. Figure B-1 is a summary breakdown of all sources of interview data.

| SOURCES OF INTERVIEW DATA   |                      |
|-----------------------------|----------------------|
| Source of Data              | Number of Interviews |
| Interviews conducted by ESC | 94                   |
| Interview transcripts       | 7                    |
| Synthesized interviews      | 57                   |
| Total                       | 158                  |

Figure B-1

b. To be consistent throughout the interview process, a standardized format was drafted and used during each interview. Figure B-2 is a sample of the interview form used by the study team. The first 17 categories of this interview form are identical to those used in the survey form. The intent was to gain greater insight into the issues by developing a narrative data base which complemented the survey baseline data. That is, the persons interviewed



## SAMPLE INTERVIEW FORM

### MIDDLE EAST DIVISION CONSTRUCTION PROGRAM

### MATRIX OF INTERVIEW CONTENT

DATE: \_\_\_\_\_ INTERVIEWED: \_\_\_\_\_ INTERVIEWER: \_\_\_\_\_

Date(s) of Tour with MED (R): \_\_\_\_\_ 19\_\_\_\_ - \_\_\_\_\_ 19\_\_\_\_.

Date(s) of Tour in Saudi: \_\_\_\_\_ 19\_\_\_\_ - \_\_\_\_\_ 19\_\_\_\_.

Date(s) of Tour(s) in other Middle East Countries (Egypt\_\_\_\_, Oman\_\_\_\_, Jordan\_\_\_\_, \_\_\_\_\_):  
\_\_\_\_\_ 19\_\_\_\_ - \_\_\_\_\_ 19\_\_\_\_.

Grade Level at time of Saudi/MED experience: GS/GM\_\_\_\_\_. Current Grade: GS/GM\_\_\_\_\_.

MED organizational element(s) of assignment: Engr\_\_\_\_, Constr\_\_\_\_, EPLD\_\_\_\_, RMD\_\_\_\_, \_\_\_\_\_.

#### EVALUATION OF USACE MED PROGRAM:

- a. Level, duration, condition of personnel assignments
- b. Organizational structure
- c. Physical location of organizational elements
- d. Cost management (financial mgt, F&A, cost control)
- e. Management control structure
- f. Quality control
- g. Contract type, contractor selection, contract negotiation
- h. Project materials (constr matl, commo equip)
- i. Safety program
- j. Security/Sensitivity

Figure B-2 (Continued on Next Page)

## SAMPLE INTERVIEW FORM--Continued

k. Engineer Assistance Agreement(s) (EAA)

l. Working conditions & living conditions

m. Management of Government Furnished Property (GFP)

n. Communications (work related & personal)

o. Planning

p. Engineer design

q. Construction management (in-house & contract)

r. Other aspects. . .

### BENEFITS TO USAGE:

• Career Development

• Organizational Vitality/Responsiveness

• National Interests

Figure B-2

addressed the same subject matter as those who participated in the survey process. However, those interviewed provided greater insight into the issues than could be obtained through the numerical rating process that comprised the survey. An additional three categories listed under "Benefits to USACE" were included on the interview form in order to get a perspective on the overall program impact on employees, organization, and country. The "Other Aspects" category was included to allow flexibility and an opportunity to collect any information that might not fit within our data collection categories. The subject most frequently discussed at this juncture was the cultural aspect of the Middle East experience and how it influenced the employees' ability to perform their tasks.

c. The detailed narrative data were recorded on tape or transcribed by shorthand. Individuals involved in the USACE Middle East experience were interviewed individually and at their convenience between December 1983 and May 1984, in Berryville or Winchester, Virginia (MED (R)), Saudi Arabia (MED (F)), or the Washington, D. C., area. Each person was assured that all transcripts of his/her interview would remain anonymous. This helped to create an atmosphere wherein the issues could be more candidly identified and addressed in greater detail by each individual. The four former MED commanders have agreed to waive this stipulation, so transcripts of their interviews will be forwarded with this document to the OCE Historical Division to aid their development of the MED History.

4. Interview Process--Data Sorting. Each interview tape or transcript was thoroughly reviewed by a study team analyst and then manually processed into ESC's computer system for analysis. The header information contained the following data: name of person interviewed, grade at start of MED experience

and current grade, organizational element(s) of assignment in MED, and dates(s) of MED experience(s). This is similar to the data contained in the header of the interview form (see Figure B-2). These identifiers allowed analysis or data sorting by category, grade, date(s) of assignment, organizational element(s), location(s) of assignment (Oman, MED (F), MED (R), Egypt, etc.), or any combination(s) of these.

5. Interview Process--Data Analysis.

a. Figure B-3 shows the number of people interviewed in each MED organizational element. Note that the greatest number of people interviewed were assigned to the Construction, Engineering, and Executive elements. Figure B-4 shows the number of people interviewed as a function of grade. From this figure, we determine the average starting grade of all civilians to be GS-12 (GS-12.31). The average current grade or grade at the time of the interview is GS-13 (GS-13.22).

b. Computer sorting was done on several combinations of variables found in the header data. The most useful for this study was a computer sort of each category by the total number of interviews (158). That is, each of the 21 categories was comprised of 158 individual narrative responses or "no comment" replies. A computer printout for each of the 21 categories was analyzed separately by the study team analysts, and a set of issues was created for each category. Results of the survey data were used to temper the interview data with objectivity and to serve as a barometer for the issues identified in the analysis.

6. Data Synthesis. The most meaningful results were obtained from the data sort on all 21 categories taken separately and analyzed individually. The exhaustive compilation of these resulting issues was then reviewed and

NUMBER OF PERSONS  
INTERVIEWED/ORGANIZATIONAL ELEMENT

| Element        | Number<br>Interviewed |
|----------------|-----------------------|
| Administration | 2                     |
| ADP            | 5                     |
| Communications | 1                     |
| Comptroller    | 3                     |
| Construction   | 62                    |
| Counsel        | 10                    |
| ELC            | 4                     |
| Engineering    | 20                    |
| EPLO           | 5                     |
| Executive      | 13                    |
| F&A            | 2                     |
| GFP            | 3                     |
| Life Support   | 1                     |
| OAS            | 3                     |
| OCE            | 1                     |
| OPD            | 1                     |
| PAO            | 1                     |
| Personnel      | 5                     |
| Procurement    | 10                    |
| Safety         | 4                     |
| Unknown        | <u>2</u>              |
| Total          | 158                   |

NOTE: These figures do not necessarily represent the organizational element at the time of interview. They do represent the organizational element of those interviewed at the start of their Middle East experience.

Figure B-3

NUMBER OF PERSONS INTERVIEWED/GRADE

| Grade | Number<br>Interviewed |       |
|-------|-----------------------|-------|
| GS-3  | 1                     | (0)   |
| GS-4  | 0                     | (0)   |
| GS-5  | 0                     | (0)   |
| GS-6  | 1                     | (1)   |
| GS-7  | 1                     | (2)   |
| GS-8  | 2                     | (0)   |
| GS-9  | 6                     | (0)   |
| GS-10 | 1                     | (1)   |
| GS-11 | 15                    | (6)   |
| GS-12 | 42                    | (24)  |
| GS-13 | 41                    | (41)  |
| GS-14 | 25                    | (44)  |
| GS-15 | 4                     | (18)  |
| SES   | 1                     | (3)   |
| CPT   | 2                     | (1)   |
| MAJ   | 2                     | (1)   |
| LTC   | 2                     | (3)   |
| COL   | 8                     | (8)   |
| BG    | 4                     | (2)   |
| MG    | 0                     | (3)   |
| Total | 158                   | (158) |

NOTE: These figures represent the number of people interviewed holding these grades at the start of their Middle East experience. The figures in parentheses ( ) represent the number of interviewed people currently holding these grades.

Figure B-4

sorted into the following major considerations: project planning, program planning, and construction. At this point, the three synthesized lists of issues were summarized collectively by the study team. The difficult reiterative process of identifying lessons learned for the summary of issues in each major field was accomplished manually by the team. In each case, the study team went back to the original data to verify the results and to assure that the issues were all relevant and accurately represented. The last process involved the placement of the lessons learned and their supporting issues into a time-related checklist of events--in essence, a sequential list of things to do and be aware of, decisions to make, and things to avoid for future planners (see Annex D).

7. Summary. The interview process was a very positive and exciting experience for the ESC study team. We were met in all cases with enthusiasm, congeniality, and sincerity. Our sponsors in Saudi Arabia were ever mindful of our needs and took extra time to ensure our comfort. Those who participated in the interview process provided us with volumes of informative data. Although the information was voluminous and the study team had to tediously analyze and sort through the data, it was timely, relevant, and hopefully useful to future planners and managers. Figure B-5 is the list of participants who contributed to the interview process--their contributions were, indeed, invaluable.

# LIST OF INTERVIEW PARTICIPANTS

---

|                       |                   |                         |
|-----------------------|-------------------|-------------------------|
| Albro, Ames (MG)*     | Galloway, Charles | Oliver, Robert          |
| Alexander, Hugh       | Graham, Larry     | Osmundson, John         |
| Asbury, Charles       | Grate, George     | Palladino, Donald       |
| Ashley, Chester       | Griggs, Kenneth   | Parkin, Elmer**         |
| Beacham, E. P.        | Gronemeyer, Gary  | Plaisance, Russell      |
| Becker, Jack          | Hall, Robert      | Pruett, Forrest         |
| Bogaczyk, Richard     | Hanson, Larry**   | Robertson, George (BG)* |
| Bowyer, Jack          | Harris, Art       | Rowland, Ron            |
| Boyd, Claude "Buck"   | Henry, Wayne      | Salyers, Philip         |
| Boyle, Jim            | Houck, Stuart     | Samahy, Aly             |
| Brasse, Bill          | Hulce, Clark      | Schaible, Robert        |
| Breen, Ronald         | Johns, Henry      | Schaufelberger, J. E.   |
| Brown, John           | Kidd, William     | Schneebeck, Gene        |
| Brule, Rodney         | Knittel, Al       | Schroder, R. E.         |
| Carozza, Tom          | Kramer, Earl**    | Smith, Robert           |
| Cater, Paul**         | Kusmak, Mike      | Stevens, Pat            |
| Chandler, Charles     | Lewis, Steven     | Sullivan, Malcolm       |
| Christiansen, Boyce   | Link, Jim         | Taylor, Chet            |
| Christiansen, William | Lord, Bob         | Taylor, Fred            |
| Coleman, Neil         | Louie, Johnell**  | Thomason, Matt          |
| Conner, Tom           | Lowell, J. J.     | Thornton, Bill          |
| Craig, Priscilla      | Mathews, Larry    | Toedter, Lee**          |
| Cruthers, William     | McFaul, Jim       | Tohill, Ed              |
| Cumper, Jim           | McGoye, Paul      | Trent, Robert           |
| Curtis, Calvin        | McMillan, W. J.   | Voelker, William        |
| Czarny, Edward        | Mintling, Barry   | Wahba, Ash              |
| Dinello, Phillip      | Moak, Bob         | Wells, Richard (MG)*    |
| Dummam, C. Nelson     | Moody, Merle      | West, Hal               |
| Ellis, J. N. (MG)*    | Murphy, Ed        | Wheeler, Ralph          |
| Eng, William          | Murphy, Fred      | Whitley, J. R.          |
| Enger Duane           | Myerchin, Barbara | Wiles, Dick             |
| Finley, Bob           | Novak, Judy       | Windisch, Mary          |
| Fountleroy, Kathy     | Ocanas, Felix     | Wintz, Edward           |
| Friestad, Ronald      |                   |                         |

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\*Former Commanders of Middle East Division.

\*\*Interview transcripts provided by OCE Historical Division.

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Figure B-5



ANNEX C

LESSONS LEARNED AND ISSUE SUMMARIES

## ANNEX C

### LESSONS LEARNED AND ISSUE SUMMARIES

1. Purpose. This annex contains a comprehensive index of the issues and corresponding lessons learned surfaced during the interview process. The issues were derived from 158 interviews conducted during the study and described in Annex B. The lessons learned were derived from recommendations made during the interviews and from ESC analysts' judgment as to the appropriate ways of resolving those major issues which surfaced with several possible courses of action.

2. Scope. Presented here are only the relevant issues. These are listed according to two categories: primary issues and secondary issues. Issues and corresponding lessons learned are presented in the sequence followed throughout the survey and interview process; i.e., according to ESC's research categories. The primary issues presented in this annex are also included in the Checklist of Considerations for New Project Planning (see Annex D). In that annex, however, the information is packaged in three program planning categories (i.e., project planning, program management, and construction) rather than 21 data-gathering categories. Even though the secondary issues shared in this annex were not included in the checklist, all of the issues summarized here are considered to be of interest to future planners of overseas engineering and construction efforts.

## LEVEL, DURATION, AND CONDITION OF PERSONNEL ASSIGNMENT

| Lessons Learned   | Issue Summary   |
|---|---|
| <u>Primary Issues</u>   |   |
| Health requirements should be rigorously enforced when environment is harsh or extreme and medical treatment and facilities underdeveloped. | Health requirements in job announcements were not enforced--some employees were unable to function in harsh environment.  |
| Structure grades to ensure filling key positions.   | Administrative and support staff grades were comparable to those in CONUS; however, engineering and construction professionals were 1 to 2 grades higher to attract and retain a capable work force.  |
| Recruiting for large overseas programs should be centralized for those positions that cannot be filled locally.                             | Recruiting many employees for overseas positions can be confusing, time consuming, ineffective.<br>Job announcements for MED positions often were received after closure date.<br>Dependents often interested in low-grade positions.   |
| Tours of top military managers should be no less than 2 years duration.   | Gear-up time for commanders and top-level managers diminishes their effectiveness on short tours.   |
| Limit accompanied tours to:<br>Top-level managers.<br>Long-term and harsh environment programs.   | Accompanied tours (> 2 years):<br>Are administratively complex.<br>Are expensive.<br>Provide program continuity.<br>Accompanied tours are best for long-term and harsh environment project.<br>Too many accompanied tours.  |
| <u>Secondary Issues</u>   |   |
|   | Unaccompanied tours (1 year):<br>Best for short-term projects.<br>Administratively simple.<br>Cost less.<br>Harder to recruit, but possible.<br>Disrupt continuity.<br>Shorter tours allow opportunity for cross-training (especially between engineering and construction).<br>Some people allow job pressures to keep them from taking EMT-EML.<br>Recruiting women for Saudi is a problem because they cannot be in high-visibility positions. |

## ORGANIZATIONAL STRUCTURE

| Lessons Learned | Issue Summary  |
|-----------------|--|
|                 | <p style="text-align: center;"><u>Primary Issues</u></p> <p>Going to an operating division would have helped the phase-down.<br/>           Too many organizational layers.<br/>           Too much management, not enough field personnel.<br/>           Staff redundancies.<br/>           Too many employees forward.<br/>           Duplicated functions of MED (F) and district.<br/>           Fragmented functional responsibilities.</p> <p>ELC necessary.<br/>           ELC needed at the beginning of the program.<br/>           ELC Commander did not have logistics background.<br/>           Better when GFP was put under ELC.</p> <p>Too many different organizations (division, district, EPLO) in one location.<br/>           Too many organizational layers.<br/>           Too much management, not enough field personnel.<br/>           Staff redundancies.<br/>           Too many employees forward.<br/>           Division with 2 to 3 districts worked well.<br/>           Area and resident offices worked well.<br/>           Duplicate functions of MED (F) and district.<br/>           No authority in field.<br/>           Fragmented functional responsibilities.<br/>           No planned organizational structure for phase-down.</p> <p>Too many employees forward.<br/>           Too much management, not enough field personnel.<br/>           Fragmented functional responsibilities.</p> <p>Support functions:<br/>           Were too spread out between division and districts.<br/>           Did not have CPO people in Saudi familiar with OPM regulations and basic personnel information.<br/>           Needed CPO people in district.<br/>           F&amp;A done in Omaha with pay delays and errors.</p> <p>Saves money.<br/>           E&amp;C too far apart:<br/>           Takes too long for design changes.<br/>           Do not understand each others' problems.<br/>           Too many organizational layers.<br/>           Too long to communicate--lack of responsiveness.<br/>           All division chiefs not in same location (F) or (R).<br/>           Got us into "we-they" situation.<br/>           MED (R) allowed buffer against local pressure by Saudis to influence contractor selection and procurement processes.</p> <p>Too many employees forward.<br/>           Saves money.<br/>           All division chiefs not in same location (F) or (R).<br/>           Fragmented functional responsibilities.<br/>           Going to operating division would have helped phase-down.<br/>           Staff redundancies.<br/>           Should have come back earlier.<br/>           Future smaller programs call for HQ at (R).</p> <p>Too many different organizations (division, district, EPLO) in one place.<br/>           Too many organizational layers.<br/>           Too much management, not enough field personnel.<br/>           Staff redundancies.<br/>           Too many employees forward.<br/>           Duplicate functions of MED (F) and district.</p> <p style="text-align: center;"><u>Secondary Issues</u></p> <p>No staff to specifically handle non-Saudi MED work.<br/>           Did not have project managers responsible for projects from start to finish and involved in all aspects of operation.<br/>           Duplication of effort--inherent in (F) and (R) organization.</p> |

## PHYSICAL LOCATION OF ORGANIZATIONAL ELEMENTS

| Lessons Learned  | Issue Summary   |
|--|---|
| <u>Primary Issues</u>  |   |
| Do not separate engineering and construction; but, if necessary, keep at least an Engineering Division Technical Team near construction sites.   | It was helpful to have engineering people near construction sites to answer questions.<br>Distance exaggerates we-they problem with engineering and construction.   |
| Consolidate support functions as much as possible with split organization.   | It is cheaper to keep as much as possible in CONUS with a split organization.<br>Split division was a problem for CPO.<br>Key financial people were needed in-country early in the project but not after the project was running. |
| Division and district offices should be located separately.  | Conflicts and duplications of effort resulted from having division and district offices in Riyadh.  |
| Locate living and working facilities in same compound or at least close together.  | The living compounds, work areas, PX, and commissary in Riyadh were too spread out.   |
| Split division appropriate early on, but consolidation to rear should have been earlier.   | Too many employees forward.<br>Saves money.<br>All division chiefs not in same location (F) or (R).<br>Fragmented functional responsibilities.<br>Should have come back earlier.<br>Future smaller programs call for HQ at (R).   |
| <u>Secondary Issues</u>  |   |
| Having the ADP center located in MED (F) reduced costs and increased reliability and continuity of operation. Having the mainframe located in MED (R) allowed for best software support. |   |

## COST MANAGEMENT

| Lessons Learned   | Issue Summary   |
|---|---|
|   | <u>Primary Issues</u>   |
| Plan and staff <u>early</u> for financial management, project tracking, funding.  | <p>Too late with:</p> <p>Project definition.</p> <p>Economy controls.</p> <p>Financial Management System (comptroller, better use of computer, project budgets).</p> <p>Manpower controls (consolidation).</p> <p>Poor cost estimates, especially early on.</p> <p>Best to lease some types of property.</p> <p>Expensive and hard to separate overhead costs.</p> <p>S&amp;A accounting classification contains too much:</p> <p>Claims adjustments.</p> <p>Services to others.</p> <p>S&amp;A, as percent of placement, is an incentive to "spend" (like CPAF).</p> |
| Avoid incremental funding where more frequent than two times/year.  | Incremental funding complicates reporting, project scheduling, customer satisfaction.   |
| Work with customer <u>early</u> to define project, cost, schedule—work to minimize change orders.   | Customer whim = too many change orders...delays, increase in overhead.  |
|   | <u>Secondary Issues</u>   |
| <p>Start lean and mean:</p> <p>--minimize support staff (F)</p> <p>--augment with TDY and overtime</p> <p>--look hard at incentives; they are hard to take away</p> | <p>Hard to reduce benefits like commissary, PX.</p> <p>Duplication of effort--inherent in (F) and (R) organization.</p> <p>Too many people forward too long.</p>  |
| Minimize accompanied tours.   | <p>Too many accompanied tours.</p> <p>Unaccompanied tours cost less.</p>  |
| Keep working and living sites in close proximity.   | <p>Working and living sites too dispersed.</p> <p>Ineffective GFP program tracking led to excessive costs.</p> <p>Life support contracts too plush.</p> <p>S&amp;A accounting classification contains too much (e.g., claims adjustment and services to others).</p>  |

## MANAGEMENT CONTROL STRUCTURE

| Lessons Learned  | Issue Summary   |
|--|---|
| <u>Primary Issues</u>  |   |
| Despite distances between organizational elements and scattered location of element chiefs, most employees were fully aware of their responsibilities and had a clear understanding of the chain of command. | There were 2 deputies, 1 (F) and 1 (R), so all division and element chiefs were not in the same location.<br>The management structure that was in Al Batin (with Chief of Construction Division heading several resident offices) worked effectively.<br>Very clear lines of responsibility and authority.<br>A logical arrangement given the situation.  |
| Minimize the number of organizational layers with project-related responsibility.  | There were too many layers of project responsibility ranging from resident engineers (who are directly in charge of the project) through branch chiefs, Chief of Construction Division to District Engineer.<br>Al Batin (F) reporting to Al Batin (R), MED (R), and OCE made for ineffective management control structure.<br>A lot of responsibility in field, but not corresponding authority. |
| Start with a leaner top management structure because once underway its hard to fix it.   | Management control structure top heavy--too many chiefs, not enough indians.<br>There was redundancy between division, district, and other organizational elements regarding program responsibility.  |
| <u>Secondary Issues</u>  |   |
|  | Military in management positions did not have enough experience in dealing with civilians.<br>OCE too involved in day-to-day operations.<br>MED was able to forecast ADP needs and make acquisitions quickly through OCE instead of DA because of Saudi funding.  |

## QUALITY ASSURANCE/QUALITY CONTROL

| Lessons Learned   | Issue Summary  |
|---|--|
| <p>Proper staffing levels, consolidated procedures, and management support make for better quality assurance and quality control.</p> | <p><u>Primary Issues</u></p> <p>Understaffed, spread too thin.<br/>Good quality assurance for limited number of people.<br/>Duplication of quality assurance between division and districts.<br/>Quality control improved as program matured.<br/>Provisions for testing inadequate.<br/>Top management involved and interested: aggressively required strong quality assurance program.<br/>Constant problems plagued project (foundations, soil, design, materials).</p> |
| <p>Communication through workshops and report books diminishes recurring problems.</p>  | <p>Quality assurance workshops create more job effectiveness.</p>  |
| <p>Training foreign-speaking contractors with differing cultural backgrounds is time consuming but necessary.</p>                     | <p>Always training foreign contractors and new USACE personnel about USACE quality assurance procedures.<br/>Language barriers.<br/>Contractor perception that good quality control costs more money, so good quality control people often are replaced.</p>   |
|   | <p><u>Secondary Issue</u></p>  |
|   | <p>Quality assistance visits sparked initiatives involving policy, training, tools, motivation.</p>  |



## CONTRACT TYPE, CONTRACTOR SELECTION, CONTRACT NEGOTIATION

| Lessons Learned   | Issue Summary  |
|---|--|
|   | <u>Primary Issues</u>  |
| Each contract should be clearly written and carefully crosschecked—it pays off during construction and contract closeout. Check for consistency in specifications and in engineering clauses, and clauses which would not apply to overseas work. | Many contracts are a mixture of both design and performance specifications—this led to problems. Engineering clauses sloppy—details not checked throughout. MED followed applicable contracting regulations, except Saudi set-asides.  |
| Contract should include maintenance and parts clause.   | Maintenance and parts are problems when buying material and equipment for a construction program 10,000 miles away.  |
| Fixed fee contracts are preferable where project is clearly defined.  | Most USACE employees prefer fixed fee contracts. If program scope is vague/changing, it would be better to go with fixed price contracts for much smaller pieces as organization becomes able to define them. The alternative is to go for CPAF contracts which tend to cost more and require more monitoring. Thus, it might be best to develop contracts as scope unfolds.   |
| CPAF contracts should only be used where:<br>Project is not defined.<br>Staff is available to monitor closely throughout.<br>Someone is familiar with them.   | Contract type depended on the kind of work, what was driving the contract (i.e., time). CPAF worked best when scope of work could not be defined yet needed to get underway. USACE tried to go with a competitive fixed price within a defined scope of work. Management of CPAF contracts was inadequate and led to embarrassing costs. CPAF contracts take large staffs to monitor—USACE has no CPAF experts.  |
| Use of RFP contracts proved more effective than awards to lowest bidder.  | Awards to low bidders have led to trouble—scrimping. Used RFP contracts which were seldom negotiated.  |
| Contractor prequalification process should screen for prior work quality as well as previous experience and adequate organizational size.   | Difficult to prequalify construction contractors from MED (R). Some poor performing contractors received follow-on work.   |
| Contractor prequalification at MED (R) provides buffer versus customer pressure to select favored companies.  | Better contractor selection in early days when more flexible and less involvement by DGMW and MODA and less participation by local contractors. DGMW has gained influence in selection process.  |
| Look closely at how contracts are divided.  | When projects are cut up vertically (i.e., subsurface, roads, and structures), it is more difficult to pinpoint responsibility when a structure or system fails. If one contract covers more than one site (even where jobs are similar), it is very difficult to monitor and close out a contract—more smaller contracts are better even where same contractor is involved. If sequencing of contracts is not carefully considered, progress can be delayed and it can be difficult to pinpoint responsibility for a failure. |
|   | <u>Secondary Issues</u>  |
|   | Had contract and lease-back contracts because foreigners cannot own land in Saudi.<br>Some contracts had single contracts covering single sites—difficult to monitor and close out.<br>Used a lot of supplementary agreements which are not permissible in CONUS.<br>Negotiations difficult because wages vary among TCN contractors.<br>Hard to hold to contract when so many TCNs unfamiliar with USACE standard.<br>Middle East countries other than Saudi more demanding and specific.                                     |

## PROJECT MATERIALS

| Lessons Learned   | Issue Summary   |
|---|---|
|   | <u>Primary Issues</u>   |
| Investigate geological and environmental conditions thoroughly.   | Harsh geological and environmental conditions:<br>Corps lacked thorough geological investigation and soil testing: compaction qualities, moisture content, salt and clay content, etc.<br>Materials used in CONUS not necessarily satisfactory for Middle East.<br>Many materials and designs not suited to area.   |
| Investigate availability and delivery capability of materials and parts; plan for contingencies.                              | Delays in obtaining materials:<br>Using certain US products and materials.<br>Philosophy of "Buy Saudi."<br>Ports clogged--months before ships off-loaded.<br>Timing of deliveries hard to schedule.<br>Spare parts not stocked in-country.<br>Many "Saudi" products and materials are not local. Were purchased through Saudi middlemen from elsewhere in world--resulted in long delays.  |
| Plan to use locally obtained products and materials early in the program.   | Corps pressured to "Buy Saudi!"<br>Products and materials were good quality.<br>Must allow for non-US specs if materials are good quality.<br>Contractors are better off buying from local market.<br>Sole source was specified but not necessary.<br>US specs used but not necessary.<br>Now have SOGS.<br>Eliminates extra staffing; reduces cost and delays.<br>Dramatic availability of products and materials from local suppliers.<br>USACE late on accepting "Buy Saudi" philosophy. |
| Create cross-reference guide to relate US specs and regs with those of client or host country.                                | USACE materials need to be keyed to international products.<br>Difficult to match DIN to US standard.<br>Saudi materials did not meet US specs.   |
| Provide contractors with project materials and equipment standardization guide to promote standardization within the program. | Standardization of project materials:<br>Lack of quality assurance and quality control in construction materials.<br>Project materials were not controlled.<br>Too many options in materials.<br>US regulations preclude specifying manufacturers--result is no standardization and maintenance problems.<br>When USACE serves as prime contractor, it sometimes provides materials to subcontractors.  |
|   | <u>Secondary Issues</u>   |
|   | DA regs make standardization difficult.<br>Corps as prime contractor provided materials to subcontractors.<br>"Buy American."<br>Specs written around US products and materials.<br>"Buy Saudi" costs more than US products and materials.<br>"Buy Saudi" causes delays.  |

## SAFETY

| Lessons Learned  | Issue Summary   |
|--|---|
| <p>Unique multi-national workforce poses safety problems that require special approach:</p> <ul style="list-style-type: none"> <li>--Bridge language barrier.</li> <li>--Educate as to USACE expectations and processes.</li> <li>--Acknowledge accomplishment.</li> <li>--Counteract avoidance and defiance (establishing cross-checks to uncover accidents contractors hide).</li> </ul> <p>Gear up early for best results.</p> <p>Emphasis on safety = results.</p> | <p><u>Primary Issues</u></p>  |
|  | <p style="text-align: center;"><u>Saudi</u></p> <p>Contractors and TCNs hired by contractors unfamiliar with US safety standards:</p> <ul style="list-style-type: none"> <li>Language barriers.</li> <li>Cultural differences; i.e., value of life, dress conventions.</li> </ul> <p>Many USACE project managers question need for vigorous safety program which imposes US values on other cultures.</p> <p>Contractors try to hide accidents.</p> <p>Some contractors (especially Koreans) want to please</p> <ul style="list-style-type: none"> <li>Need to know how.</li> <li>Need recognition for accomplishment; e.g. quarterly awards.</li> </ul>  |
|  | <p style="text-align: center;"><u>Other Middle East Countries</u></p> <p>Good program 1st year of placement, 2d year rate climbed due to increased volume of placement.</p> <p>Ridicule and defiance common.</p> <p>No safety program initially.</p> <p>Safety officer late coming on board.</p> <p>Very good and improving record (improved when safety officer on board).</p> <ul style="list-style-type: none"> <li>Visibility on site.</li> <li>Safety requirement in job descriptions.</li> <li>Awards program.</li> <li>Management interest.</li> </ul> <p>Harsh environment increases safety problems: heat, aridity, exaggerated health hazards, inferior medical care, water quality, and driving hazards.</p> <p>Safety is expensive--no financial incentive.</p> |
|  | <p><u>Secondary Issue</u></p> <p>US-initiated work safety a concern.</p>  |

## SECURITY SENSITIVITY

| Lessons Learned   | Issue Summary   |
|---|---|
| <p>Early on, be aware of other countries' policies on security; design and execute construction projects accordingly.</p> | <p><u>Primary Issues</u></p> <p>Saudis do not want publicity in their military construction program.</p> <p>Security has not been a primary concern to the USACE in design of facilities.</p> <p>Saudis are very security conscious.</p> <p>Despite Saudi efforts to keep construction project details confidential, US laws require public advertising in CBD for proposals and bids.</p> <p>Saudis require all plans, blueprints, etc., be safeguarded.</p> <p>USACE told not to photograph specific things during and after construction.</p> <p>Living and working compounds are very secure--sometimes too secure.</p> <p>Security badges and ID cards required for all projects.</p> <p>Over-cautious screening of personnel and equipment.</p> <p>Aerial photos for construction prohibited at first.</p> <p>USACE cannot take design and construction files off base.</p> <p>Much equipment and property is subject to whims of officials and inspectors.</p> |
| <p>Take US citizen translators to remote areas when language translation needed.</p>                                      | <p>Locally hired translators tend to inject their own Middle East thinking into their translations--this does not help the interests of USACE and casts doubts on where their loyalties lie.</p>  |

## ENGINEER ASSISTANCE AGREEMENT (EAA)

| Lessons Learned  | Issue Summary  |
|--|--|
| <u>Primary Issues</u>  |  |
| Essential to define relationship with customer at outset:            | Division Engineer initially had contracting officer authority—through precedent, Saudis lessened USACE authority.  |
| Employee status—at least status of embassy personnel.                | Initially, MODA money direct to USACE in a lump sum at project approval—Saudis now funding incrementally on monthly basis.   |
| Contracting policy/process.  | Initially, USACE used its usual procedures—now, Saudis are pressing for more streamlined procurement and contracting procedures.   |
| Payment process.   | Saudis initially granted USACE a strong position (especially as regards: USACE employee immunity to Saudi law)—subsequently, Saudis changed and developed rapidly and became discontent with the arrangement.        |
| Renegotiation provisions.  |  |
| The current EAA is a model for future MOUs with third world nations. | The EAA began as an open-ended diplomat's document—not lawyer's document. Left lots of room for interpretation.<br>EAA evolved with program—some commanders may have given too much without renegotiating agreement. |

## WORKING CONDITIONS AND LIVING CONDITIONS

| Lessons Learned   | Issue Summary  |
|---|--|
|   | <u>Primary Issues</u>  |
| <p>Start with limited benefits and increase if needed rather than planning to reduce later in project.</p>  | <p>Living conditions:</p> <ul style="list-style-type: none"> <li>Adequate health care for minor problems.</li> <li>Early in program, poor; improved over time.</li> <li>Captive environment.</li> <li>Operating hours of PX and commissary inconvenient for those working out of town.</li> <li>Great benefits package.</li> <li>Great recreation facilities--still some complaints.</li> <li>Very expensive.</li> <li>Could be more austere.</li> <li>DOD schools disaster.</li> </ul> <p>Working conditions:</p> <ul style="list-style-type: none"> <li>As good as any.</li> </ul> |
| <p>Design compounds so that:</p> <ul style="list-style-type: none"> <li>Living and working areas are more centrally located.</li> <li>They attract workers, but are not so good that they are better than what the workers have at home.</li> </ul> | <p>Living arrangement in compound near KCMC ideal situation.</p> <p>Living and working areas around Riyadh and associated buildings too scattered.</p>   |
| <p>Be sure to have consistency in housing policies.</p>   | <p>HQ ignored living and working conditions in remote areas:</p> <ul style="list-style-type: none"> <li>Tabuk--no local shopping available.</li> <li>Al Batin--remote.</li> </ul> <p>Families received best housing and furnishings in Riyadh--inconsistent housing policy.</p>  |
| <p>Be aware that within a country there can be problems peculiar to a specific location that should be addressed separately.</p>  | <p>Unsafe driving conditions.</p> <p>Harsh environment.</p> <p>Captive environment.</p>  |

## MANAGEMENT OF GOVERNMENT FURNISHED PROPERTY (GFP)

| Lessons Learned   | Issue Summary   |
|---|---|
|   | <u>Primary Issues</u>   |
| USACE did a poor job in GFP, lost credibility with its clients. Three options for future: | Tracking system never effectively worked.<br>Poor financial records were kept.<br>Materiel often arrived too early or too late.<br>Materiel damaged in shipment and at customs.<br>Packing lists often inaccurate.<br>Materiel often did not meet specifications.<br>No management emphasis on GFP.<br>No central control of GFP.<br>Lacked coordination among engineer, construction, and procurement.<br>In reactive mode to problems.<br>No GFP in planning stage.<br>ELC staff too small with too few expert logisticians misplaced in organizational structure; got responsibility for GFP too late. |
| Stay out of GFP. Leave it to the experts.   | ELC staff too small with too few expert logisticians.   |
| Monitor large items, let contractor monitor smaller items.                                | Contractor has a sense of urgency about furnished property that USACE does not.<br>Contractor can do furnished property cheaper, with fewer legal constraints, and less bureaucratic constraints.   |
| Get expertise and do it right, especially tracking.                                       | ELC staff too small with too few expert logisticians.<br>Tracking system never effectively worked.  |

## COMMUNICATION

| Lessons Learned  | Issue Summary   |
|--|---|
|  | <u>Primary Issues</u>   |
| <p>Where time lag, cultural factors and distance combine to limit overlap of work week, alternate work schedules should be adopted to facilitate early project stages.</p>   | <p>Time and distance hinder communication--little overlap in work week.</p>   |
| <p>Adequate communication capability is expensive but necessary:</p> <ul style="list-style-type: none"> <li>ADP equipment.</li> <li>Facsimile transmitter.</li> <li>Phone lines.</li> <li>APO.</li> <li>Microwave System.</li> </ul> | <p>International mail faster than average, but customs employees do much damage.</p> <p>There was no APO in Oman so mail took 2 to 4 weeks via diplomatic pouch.</p> <p>Phones adequate, but expensive.</p> <p>Need more phone lines at area offices.</p> <p>Facsimile communication with Oman now.</p> <p>Facsimile machine a great asset.</p> <p>MED (F) did not have enough ADP or word processing equipment.</p> <p>Communication time allocation per rank a problem.</p> <p>There was not a plan for disposing of or subsequent usage for expensive equipment.</p> <p>Capability evolved from poor to excellent.</p> |
| <p>Rapid and frequent communication capability essential to effective construction programming.</p>  | <p>Problem communicating engineer design to people in Saudi and construction progress reports to engineering (as in US).</p> <p>Communication in personnel field a problem: EMT-EML orders, voucher processing, 52s.</p> <p>Employees needed and appreciated being allowed to use phones for personal calls home.</p> <p>Saudi-OCE communication a problem.</p> <p>Daily communication with CONUS essential.</p> <p>Good contractor-USACE communication at KKMC via S.A.M.E.</p> <p>Capability evolved from poor to excellent.</p>  |
| <p>Host nation may oppose some kinds of communication due to security or cultural concerns; so plan ahead.</p>   | <p>Saudis reluctant to allow communication equipment in-country (handheld radios).</p> <p>Work sites did not have phones and radios for contractor's outside calls--business and safety implications.</p>   |
|  | <u>Secondary Issues</u>   |
|  | <p>Lack of daily newspaper made people feel isolated.</p> <p>Rumors abounded at isolated sites like KKMC.</p> <p>Language is a barrier.</p> <p>Reporting a failure is a problem with third world nations.</p>   |



## PLANNING

| Lessons Learned  | Issue Summary   |
|--|---|
| <u>Primary Issues</u>  |   |
| Project planning should be done by Engineering Division personnel with prior experience in planning and management in overseas environment.  | It was difficult to plan because USACE did not know what Saudis wanted.<br>USACE engineer designs based on US customs and specs with insufficient attention to client's culture and preferences.<br>USACE did a poor job in life support planning, especially in housing.<br>Sometimes we were too optimistic about when projects would be completed.<br>Many technical lessons learned were not incorporated into useful plans and specs. This created the need for numerous change orders.<br>There was no Planning Division--Engineering Division handled all project planning.<br>Did not plan enough time for subsurface exploration.<br>AE was not required to give lists of spare parts, tools, equipment, etc.--led to disputes on design intent. |
| Organize for project planning so execution plan is internal staff effort or provide command emphasis on following plan.  | Project planning must relate to the organization responsible for implementation and execution.<br>Ad hoc planning committees were composed of less than Division/Branch Chiefs.<br>Project plans were often ignored.  |
| When doing initial planning, be sure to consider all potential interfaces among players (e.g., engineering and construction, construction and contractors).  | No effective interrelationship between construction efforts adjacent to one another.<br>Planning could have helped with problem of contractor interface.<br>Many design packages were done entirely in rear with no interface with people in field.   |
| Get the client involved in project planning to hold down changes.  | Saudis did not entirely know what they wanted. Corps had to research everything.<br>Hard to plan when Saudis change their minds so frequently.<br>USACE did well in planning in spite of numerous change orders and modifications.<br>Even when involved, client continued to change project scope throughout project.  |
| At overseas program initiation, the responsible division should establish a planning team charged with setting up program organization procedures, policies, and establishing contact with client nations to clarify the country-to-country relationships and the program scope. | Plan for project planning, when followed, gave MED elements an excellent coordinated plan to design and construct projects.<br>Logistics is critical consideration--must be planned in detail from the outset.<br>Did not do a great deal of planning; no 5-year nor 10-year plan.  |
| <u>Secondary Issues</u>  |   |
| USACE designed and master planned much more than they actually built; Corps greatly overestimates its ability to move quickly, especially in technical areas of planning.<br>The client was not entirely involved in planning phases.  |   |

## ENGINEER DESIGN

| Lessons Learned   | Issue Summary   |
|---|---|
|   | <u>Primary Issues</u>   |
| Avoid designing state-of-the-art structures when maintenance will be difficult for customer (or US personnel)--stick with the basics.   | State-of-the-art designs were used in numerous projects.<br>Corps did not adequately address need for top-quality people for O&M of facilities.<br>Saudis did not express concern for O&M.<br>Corps did not emphasize using good solid basic design for structures in Saudi Arabia.   |
| Have a person knowledgeable about the project design on site during construction to approve changes and clarify questions (could even be a representative of AE design contractor). | Due to distance between elements there has been far too little coordination between engineering and construction.<br>Cannot always determine intent of design.<br>Cannot easily obtain timely clarifications.<br>Established engineer element forward to coordinate engineering questions between (F) and (R).  |
| Build prototypes early when dealing with a customer that has difficulty conceptualizing the final product from designs, especially when there will be several similar structures.   | Corps did not begin building prototypes early enough in the program. This resulted in change orders.  |
| Be more aggressive in collecting and sharing lessons learned about design problems to avoid repeating mistakes.   | Same errors were carried to other designs: "lessons learned" was not being disseminated and/or not being used.  |
| Overall, engineer design was good.  | Many consider quality of design to be excellent. Hired some of best AE talent in the world.   |
| Emphasize standardized design of component elements (e.g., pre-cast panels) as well as entire units (e.g., housing units).  | Corps did not emphasize standardization.<br>Allowed over 1700 different shapes of architectural concrete when only 100-200 would have sufficed.   |
| Emphasize the value engineering program and have a value engineering officer working at the design stage.   | Value engineering has not been emphasized as much overseas as in USA. Contractors in Saudi are not familiar with value engineering.   |
| Pinpoint and rectify design problems early; i.e., review more thoroughly and research environment more thoroughly.  | Quality control of design was poor:<br>Tight time schedules created design deficiencies.<br>Corps did not give enough definition and guidance to AE.<br>Review process was neither thorough nor complete.<br>Far too many oversights in designs released to field.<br>Resulted in numerous change orders.<br>Insufficient time was spent on foundations research and testing.<br>AE was not knowledgeable enough in Saudi conditions.<br>Storm drainage was inadequate.<br>Soils testing proved insufficient. |
| Examine the culture and environment to ensure the design reflects the host country.   | Insufficient time was spent on researching client's cultural and environmental background. Corps did not actively involve client in design. Cultural considerations not well known and understood. Host political agencies not involved in design.<br>Many projects were under-designed for culture.  |
|   | <u>Secondary Issue</u>  |
|   | Completed designs may sit on shelf for long time and must be rewritten or revised to meet current specs and standards.  |

## CONSTRUCTION

| Lessons Learned  | Issue Summary   |
|--|---|
| <u>Primary Issues</u>  |   |
| Keep construction management in-house.   | Experience in construction management got better with time.<br>Contractor construction management was not as good as Corps management.<br>Construction management done almost exclusively in-house:<br>Title II overpaid and not as qualified as USACE personnel.<br>USACE personnel do better job for less pay.<br>District-managed construction contracts are good; ELC-managed construction contracts are very poor.<br>More control over construction management if done in-house.<br>Corps construction managers in Saudi do not manage resources and assets as they would in the USA (personnel, high grades, labor laws, etc.).<br>USACE is a good construction management organization.<br>Too often the Corps spent too much time educating contractors on construction and contract management.<br>Saudis had entirely different view of contract management. They do not understand our regulations and policy; they think we are too easy on contractors.<br>Many good foreign and US contractors evolved as a result of the USACE work in the Middle East. |
| Put enough construction management people in the field to oversee the job--make sure they are capable and know what to do. | Corps had more people on paper management and not enough on field supervision.<br>Frequently very short-handed in construction management personnel. (Had to work 14 hours a day, 7 days a week.)<br>Personnel turnover was extremely high with contract management personnel.<br>There were no detailed sets of SOPs outlining contract managers' responsibilities for each field office position.<br>There has been no overlap of personnel assignments to provide continuity.<br>Construction personnel had insufficient skills in foundations and geo-technical areas.<br>Construction management involved putting out too many fires.<br>Contractors were not forced to comply with design specs.  |
| Give field personnel the management authority they require to do their jobs well.  | Field personnel are given responsibility but not corresponding authority in their job.  |
| Use a network analysis system to monitor construction.   | Needed to use computers more often to keep up with contractors.   |
| Hire enough construction management people at beginning of program.  | Construction management staff arrived too late in program.<br>Projects exceptionally large and complex.<br>Essential to get the best people available early in program.   |
| Have enough key USACE construction personnel who have management background.   | It is mandatory for District Engineers to have a strong construction and contract management background.<br>There was a lack of supervision of construction personnel.  |

## CULTURAL ASPECTS

| Lessons Learned  | Issue Summary   |
|--|---|
|  | <u>Primary Issues</u>   |
| Save time and money by knowing culture and language (i.e., bringing own translator).<br>Prior to start of program.<br>FSI for managers and project planners. | USACE arrogant in foreign cultures:<br>Adhere to rigid DOD and DA regs.<br>No compromise in ways of doing business overseas.<br>FSI program not used by key USACE persons overseas.<br>Insufficient program for indoctrination into culture for all overseas employees.   |
| Often difficult to consider all cultural factors in design.  | Cultural aspects of design:<br>Bars on school windows.<br>Walls around schools.<br>Privacy trim on toilets.<br>Translucent glass on school windows.<br>Mosques oriented toward Mecca.<br>Commodores oriented away from Mecca.   |
| Must keep track of evolution of host country's culture, requirements, and attitude.  | Saudis respect our firmness but do not appreciate it.<br>Saudis are diplomatic; Americans blunt.<br>Saudis are very honest and hospitable:<br>Money changes hands openly.<br>Personal property left in public and not stolen.<br>Always offer tea and coffee to all guests.<br>Would kill their only goat to serve you.<br>Amenities take precedence over rigid time schedules.<br>Saudis perception of USACE:<br>Contractors or employees making big profit.<br>Lower class "citizens."<br>Different grades of houseboys.<br>Infidels:<br>Women workers.<br>Alcohol, pork.<br>Discourage practice of other religions.<br>Allah controls production schedules:<br>Live each day as it comes.<br>No anticipation for delivery of materials.<br>No manpower mobilization planning.<br>Saudis paranoid about security and secrecy:<br>Corps work considered TOP SECRET.<br>Badges and ID cards required for all projects.<br>Careful screening of personnel and equipment.<br>Concrete solidified awaiting clearance.<br>Ambulances have been delayed.<br>Publications, photos, press meetings.<br>Correspondence is personal property.<br>Saudis lose respect for us quickly:<br>We do not learn the culture.<br>We do not attempt to learn the language. |

## CAREER DEVELOPMENT

| Lessons Learned  | Issue Summary   |
|--|---|
|  | <u>Primary Issues</u>   |
|  | <u>USACE Pros</u>   |
| USACE organization gained far more than it lost in terms of workforce development. | Engineering and construction communication improved.<br>Experience transferable to future international projects (Sinai, Oman, etc.)<br>Enhanced capability in engineer, construction, P&S, personnel management.<br>New blood throughout USACE due to forced mobility on return.<br>Prepares key leaders for positions at district, division, and OCE. |
|  | <u>USACE Cons</u>   |
|  | Experience may not help divisions and districts.<br>Fast promotion = experience gaps.<br>Individuals benefit greater than USACE (may lose many good employees on return due to not placing them well).<br>MC benefits greater than CW.  |
|  | <u>Individuals--Pros</u>  |
| USACE personnel benefitted from MED, Saudi experience.                             | Rapid promotion.<br>Broad, challenging work:<br>Magnitude.<br>Material.<br>Pace.<br>International.<br>Benefit and opportunity for young.<br>Opportunity for engineering and construction cross-training.<br>Monetary benefits.  |
|  | <u>Individuals--Cons</u>  |
| Some individuals suffer temporary setbacks despite career-enhancing opportunity.   | Left off mainstream:<br>P&S.<br>Attorney.<br>Logistics.<br>Fast promotion = some gaps.<br>MC personnel benefit more than CW personnel.<br>USACE minimum assistance on return.<br>Likely downgrade.<br>Job hunt difficult from overseas.<br>Some forced into career shifts.  |

## ORGANIZATIONAL VITALITY/RESPONSIVENESS

| Lessons Learned | Issue Summary |
|-----------------|---------------|
|-----------------|---------------|

### Primary Issues

USACE has proven it can take on a project of this type successfully.

Successfully developed unique procedures to get job done—proved innovative capability.

Organization has proved that it can accommodate distances between design and placement.

Oman project showed USACE's ability to react to an overseas MC program on short notice when at a disadvantage in knowledge and distance from a project.

USACE is flexible and responsive and has a workforce willing to take on projects like Saudi.

Good combination of the best of military and civilian workforce.

No problem quickly sending people to other projects when they have a pool of people with experience and visas, shots, passports, etc.

This kind of program attracts people looking for challenges.

Program like Saudi attracts vital, responsive people that tend to stimulate those at home.

USACE was able to pull the talent it needed from within (a sign of vitality).

### Secondary Issue

USACE was responsive and flexible but could have been more so.

## NATIONAL INTERESTS

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### Lessons Learned

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### Issue Summary

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#### Primary Issues

When performed well, USACE construction overseas can be in national interest if they:

Support friendly military forces.

Support US military posture.

Provide a US presence in a strategically located world area.

Are agreeable to and beneficial to client nation.

Help US economy.

Provide experience for future efforts.

USACE construction program:

Supports friendly military forces.

Supports US military posture.

Promotes US-Saudi political relationship.

Saudi strategically located and playing bigger role in Middle East peace process.

Saudis want to keep us there.

Helped get Saudi to hold down oil production.

Helped US economy.

Provides experience for future efforts.

National interests difficult to recognize.

ANNEX D

CHECKLIST OF CONSIDERATIONS FOR NEW PROJECT PLANNING



## ANNEX D

### CHECKLIST OF CONSIDERATIONS FOR NEW PROJECT PLANNING

This annex is the Checklist of Considerations for New Project Planning. It contains much, but not all, of the information presented in Annex C. In Annex C, the information is organized according to the 21 research categories established at the outset of the ESC research phase. Here in Annex D, the information is presented in what we think is a more useful format--according to topics of interest to future program planners and decisionmakers. The three major categories of lessons learned are: project planning, program planning (management-related and customer-related), and construction activity. In all, there are 81 lessons learned spread among these three categories and a fourth general category which presents the insights resulting from inquiries into the general benefits resulting from the Middle East construction program (career development, organizational vitality/responsiveness, and national interests). Within the three major categories of lessons learned, the items are listed from top to bottom according to when in the progress of the program they would be expected to be of interest. Thus, the program planning comments appear at the top of the checklist while the project planning comments are in the middle and the construction activities are placed at the end.

## PROGRAM PLANNING

| Customer-Related Program Planning<br>Supporting Issues   | Lessons Learned   | Management-Related Program Planning<br>Supporting Issues  |
|--|---|---|
| <p>Division Engineer initially had contracting officer authority--through precedent, Saudis lessened USACE authority.</p> <p>Initially, MODA money direct to USACE, up front, at project approval--Saudis now funding incrementally on monthly basis.</p> <p>Initially, USACE used its usual procedures--now Saudis are pressing for more streamlined procurement and contracting procedures.</p> <p>Saudis initially granted USACE a strong position (especially as regards USACE employee immunity to Saudi law)--subsequently, Saudis changed/developed rapidly and became discontent with the arrangement.</p> <p>The EAA began as an open-ended diplomat's document, not lawyer's document. Left lots of room for interpretation. EAA evolved with program (some commanders may have given too much without renegotiating agreement).</p> | <p>Organize early for total program--start to finish:</p> <ul style="list-style-type: none"> <li>Use team of experienced planners.</li> <li>Start lean.</li> <li>Secure knowledge of country and job sites.</li> <li>Set up flexible organization.</li> <li>Avoid duplication of functions.</li> <li>Consolidate support functions.</li> <li>Look hard at incentives; they are hard to take away.</li> </ul> <p>At overseas program initiation, the responsible division should establish a planning team charged with setting up program organization, procedures, policies, and establishing contact with client nations to clarify the country-to-country relationships and the program scope.</p> <p>Essential to define relationship with customer at outset:</p> <ul style="list-style-type: none"> <li>Employee status--at least status of embassy personnel.</li> <li>Contracting policy/process.</li> <li>Payment provisions.</li> <li>Arbitration process.</li> <li>Renegotiation provisions.</li> </ul> <p>The current EAA is model for future MOUs with third world nations.</p> <p>Start with a leaner top management structure because once underway it's hard to fix it.</p> | <p><u>Division (F)</u></p> <ul style="list-style-type: none"> <li>Too many different organizations (division, district, EPLO) in one location.</li> <li>Too many organizational layers.</li> <li>Too much management, not enough field personnel.</li> <li>Staff redundancies.</li> <li>Too many employees (F).</li> <li>Division with 2 to 3 districts worked well.</li> <li>Area and resident offices worked well.</li> <li>Duplicate functions of MED (F) and district.</li> <li>No authority in field.</li> <li>Fragmented functional responsibilities.</li> <li>No planned organizational structure for phase-down.</li> <li>Hard to reduce benefits (PX, commissary).</li> <li>Life support contracts too plush.</li> <li>Duplication of effort--inherent in (F) (R) organization.</li> <li>Too much forward too long.</li> </ul> <p>Plan for project planning, when followed, gave MED elements an excellent coordinated plan to design and construct projects.</p> <p>Logistics is critical consideration: must be planned in detail from the outset.</p> <p>Did not do a great deal of planning; no 5-year nor 10-year plan.</p> <p>Management control structure top heavy--too many chiefs, not enough Indians.</p> <p>There was redundancy between division, district, and other organizational elements regarding program responsibility.</p> |

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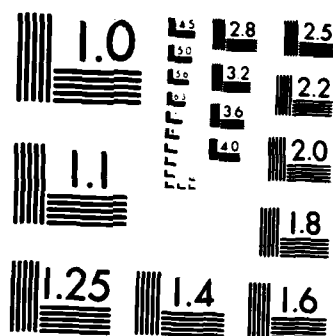
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## PROGRAM PLANNING--Continued

| Customer-Related Program Planning<br>Supporting Issues | Lessons Learned   | Management-Related Program Planning<br>Supporting Issues  |
|--|---|---|
|  | Consider using operating division structure or a modification. Weigh factors such as program size and duration.       | Going to an operating division would have helped the phase-down. Too many organizational layers. Too much management, not enough field personnel. Staff redundancies. Too many employees (F). Duplicate functions of MED (F) and district. Fragmented functional responsibilities.  |
|  | (F) and (R) structure is OK at division level, but must maintain right balance between effectiveness and cost saving. | Saves money. E&C too far apart: Takes too long for design changes. Do not understand each others' problems. Too many organizational layers. Too long to communicate--lack of responsiveness. All division chiefs not in same location (F) or (R). Got us into "we-they" situation. MED (R) allowed buffer against local pressure by Saudis to influence contractor selection and procurement processes.   |
|  | Do not set up (F) and (R) structure at district level.  | Too many different organizations (division, district, EPLO) in one place. Too many organizational layers. Too much management, not enough field personnel. Staff redundancies. Too many employees forward. Duplicate functions of MED (F) and district.   |
|  | Minimize the number of organizational layers with project-related responsibility.                                     | There were many layers of project responsibility ranging from resident engineers (who are directly in charge of the project) through branch chiefs, chiefs of Construction Division) to District Engineer. Al Batin (F) reporting to Al Batin (R), MED (R), and OCE made for ineffective management control structure. A lot of responsibility in field, but not corresponding authority.   |
|  | Plan and staff <u>early</u> for financial management, project tracking, funding.                                      | Too late with:<br>Project definition.<br>Economy controls.<br>Financial management system (controller, better use of computer, project budgets).<br>Manpower controls (consolidation).<br>Poor cost estimates, especially early on.<br>Best to lease some types of property.<br>Expensive and hard to separate overhead costs.<br>S&A accounting classification contains too much:<br>Claims adjustments.<br>Services to others.<br>S&A, as percent of placement, is an incentive to "spend" (like CPAF). |

## PROGRAM PLANNING--Continued

| Customer-Related Program Planning<br>Supporting Issues   | Lessons Learned   | Management-Related Program Planning<br>Supporting Issues   |
|--|---|--|
| <p>Unsafe driving conditions.<br/>Marsh environment.<br/>Captive environment.</p>  | <p>Have a logistics branch at the division level headed by a logistician.</p>   | <p>ELC necessary.<br/>ELC needed at the beginning of the program.<br/>ELC Commander did not have logistics background.<br/>Better when GFF was put under ELC.</p>  |
|  | <p>Do not separate E&amp;C; but, if necessary, keep at least a liaison engineering team near construction sites.</p>  | <p>It was helpful to have engineering people near construction sites to answer questions.</p>  |
|  | <p>Consolidate support functions as much as possible with split organization.</p>   | <p>It is cheaper to keep as much (R) as possible with a split organization.<br/>Split division was a problem for CPO.<br/>Key financial people were needed in-country early in the project, but not after the project was running.</p>         |
|  | <p>Division and district offices should be located separately.</p>  | <p>Conflicts and duplication of effort resulted from having division and district offices in Riyadh.</p>   |
|  | <p>Be aware that within a country there can be problems peculiar to a specific location that should be addressed separately.</p>                                      | <p>Administrative and support staff grades were comparable to those in CONUS; however, E&amp;C professionals were 1 to 2 grades higher to attract and retain a capable work force.</p>   |
| <p>USACE arrogant in foreign cultures.<br/>Adhere to rigid DOD/DA regs.<br/>No compromise in ways of doing business overseas.<br/>FSI program not used by key USACE persons overseas.<br/>Insufficient program for indoctrination into culture for all overseas employees.</p> | <p>Structure grades to ensure filling key positions.</p>  | <p>Recruiting many employees for overseas positions can be confusing, time consuming, ineffective.<br/>Job announcements for MED positions often were received after closure date.<br/>Dependents often interested in low-grade positions.</p> |
|  | <p>Recruiting for large overseas programs should be centralized for those positions that cannot be filled locally.</p>  | <p>Recruiting many employees for overseas positions can be confusing, time consuming, ineffective.<br/>Job announcements for MED positions often were received after closure date.<br/>Dependents often interested in low-grade positions.</p> |
|  | <p>Save time and money by knowing culture and language (i.e., bringing own translator).<br/>Prior to start of program.<br/>FSI for managers and project planners.</p> | <p>Gear-up time for commanders and top-level managers diminishes their effectiveness on short tours.</p>   |
|  | <p>Tours of top military managers should be no less than 2-year duration.</p>   | <p>Accompanied tours:<br/>Are administratively complex.<br/>Are expensive.<br/>Provide program continuity.<br/>Are best for long-term and harsh environment project.<br/>Too many accompanied tours.</p>                                       |
|  | <p>Limit accompanied tours to:<br/>Top-level managers.<br/>Long-term harsh environment programs.</p>  | <p>Too many employees (F).<br/>Too much management, not enough field personnel.<br/>Fragmented functional responsibilities.</p>  |
| <p>Use TDY extensively early on and throughout as needed to keep forward staffing down.</p>  | <p>Use TDY extensively early on and throughout as needed to keep forward staffing down.</p>   | <p>Too many employees (F).<br/>Too much management, not enough field personnel.<br/>Fragmented functional responsibilities.</p>  |

## PROGRAM PLANNING--Continued

| Customer-Related Program Planning<br>Supporting Issues   | Lessons Learned   | Management-Related Program Planning<br>Supporting Issues   |
|--|---|--|
| Living arrangement in compound near<br>KKMC ideal situation.<br>Living and working areas around<br>Riyadh and associated buildings<br>too scattered.   | Locate living and working facilities<br>in same compound or at least close<br>together.   | The living compounds, work areas,<br>PX, and commissary in Riyadh were<br>too spread out.<br>Working/living sites too dispersed.   |
| HQ ignored living and working condi-<br>tions in remote areas:<br>Tabuk--no local shopping avail-<br>able.<br>Al Batin--remote.<br>Families received best housing and<br>furnishings in Riyadh (inconsis-<br>tent housing policy).   | Design compounds so that:<br>Living and working areas are more<br>centrally located.<br>They attract workers, but are not<br>so good that they are better<br>than what the workers have at<br>home. |  |
| Living conditions:<br>Adequate health care for minor<br>problems.<br>Early in program, poor; improved<br>over time.<br>Captive environment.<br>Operating hours of PX and commis-<br>sary inconvenient for those<br>working out of town.<br>Great benefits package.<br>Great recreation facilities--still<br>some complaints.<br>Very expensive.<br>Could be more austere.<br>DOD schools disaster.<br>Working conditions:<br>As good as any. | Be sure to have consistency in hous-<br>ing policies.   |  |
|  | Start with limited benefits and<br>increase if needed rather than<br>planning to reduce later in project.   |  |
|  | Health requirements should be rigor-<br>ously enforced when environment is<br>harsh or medical treatment and<br>facilities underdeveloped.  | Health requirements in job announce-<br>ments were not enforced--some<br>employees were unable to function in<br>harsh environment.  |
|  | Where time lag, cultural factors and<br>distance combine to limit overlap of<br>work week, alternate work schedules<br>should be adopted to facilitate<br>early project stages.                     | Time and distance hinder communica-<br>tion (little overlap in work week).   |
|  | Adequate communication capability is<br>expensive but necessary:<br>ADP equipment.<br>Facsimile transmitter.<br>Phone lines.<br>APO.<br>Microwave system.   | International mail faster than APO,<br>but customs employees much dam-<br>age.<br>There was no APO in Oman so mail<br>took 2 to 4 weeks via diplomatic<br>pouch.<br>Phones adequate, but expensive.<br>Need more phone lines at area<br>office.<br>Facsimile communication with Oman<br>now.<br>Facsimile machine a great asset.<br>MED (F) did not have enough ADP or<br>word processing equipment.<br>Communication time allocation per<br>rank is a problem.<br>There was no plan for disposing of<br>or subsequent usage for expensive<br>equipment. |

## PROGRAM PLANNING--Continued

| Customer-Related Program Planning<br>Supporting Issues   | Lessons Learned  | Management-Related Program Planning<br>Supporting Issues  |
|--|--|---|
|  | Rapid and frequent communication capability essential to effective construction program.   | Problem communicating engineer design to people in Saudi and construction progress reports to Engineering Division (as in US). Communication in personnel field a problem. EMT and ENL orders, voucher processing, 52a. Saudi-OCE communication a problem. Daily communication with CONUS essential. Good contractor-USACE communication at KMC via S.A.M.E. Capability evolved from poor to excellent. |
| Saudis reluctant to allow communication equipment in-country (hand-held radios).<br>Work sites did not have phones and radios for contractor's outside calls--business and safety implications.                              | Most nation may oppose some kinds of communication due to security or cultural concerns--so plan ahead.  |   |
|  | Avoid incremental funding where more frequent than 2 times a year.   | Incremental funding complicates reporting, project scheduling, and customer satisfaction.   |
| Customer whim = too many change orders...delays, increase in overhead.   | Work with customer early to define project, cost, schedule--work to minimize change orders.  |   |
| Cultural aspects of design:<br>Bars on school windows.<br>Walls around schools.<br>Privacy trim on toilets.<br>Translucent glass on school windows.<br>Mosques oriented toward Mecca.<br>Commodore oriented away from Mecca. | Often difficult to consider all cultural factors in design.  |   |
|  | Ensure field personnel direct access to knowledgeable support personnel (i.e., CPO, F&A, Counsel).   | Support functions:<br>Were too spread out between division and districts.<br>Did not have CPO people in Saudi familiar with OPM regs and basic personnel information.<br>Needed CPO people in district.<br>F&A done in Omaha with pay delays and errors.  |
|  | Despite distances between organizational elements and scattered location of element chiefs, most employees were fully aware of their responsibilities and had a clear understanding of the chain of command. | There were 2 deputies (one (F) and one (R)), so all division/element chiefs were not in the same location.<br>The management structure that was in Al Batin (with Chief of Construction Division heading several resident offices) worked effectively.<br>Very clear lines of responsibility and authority.<br>Logical arrangement considering the situation.   |



## PROGRAM PLANNING--Continued

| Customer-Related Program Planning<br>Supporting Issues   | Lessons Learned  | Management-Related Program Planning<br>Supporting Issues   |
|--|--|--|
| <p>Saudis respect our firmness but do not appreciate it.</p> <p>Saudis are diplomatic; Americans blunt.</p> <p>Saudis are very honest and hospitable:</p> <ul style="list-style-type: none"> <li>Money changes hands openly.</li> <li>Personal property left in public and not stolen.</li> <li>Always offer tea and coffee to all guests.</li> <li>Would kill their only goat to serve you.</li> <li>Amenities take precedence over rigid time schedules.</li> </ul> <p>Saudis perception of USACE:</p> <ul style="list-style-type: none"> <li>Contractors or employees making big profit.</li> <li>Lower class "citizens."</li> <li>Different grades of houseboys.</li> </ul> <p>Infidels:</p> <ul style="list-style-type: none"> <li>Women workers.</li> <li>Alcohol, pork.</li> <li>Discourage practice of other religions.</li> </ul> <p>Allah controls production schedules:</p> <ul style="list-style-type: none"> <li>Live each day as it comes.</li> <li>No anticipation for delivery of materials.</li> <li>No manpower mobilization planning.</li> </ul> <p>Saudis paranoid about security and secrecy:</p> <ul style="list-style-type: none"> <li>Corps work considered TOP SECRET.</li> <li>Badges and ID cards required for all projects.</li> <li>Careful screening of personnel/equipment:</li> <li>Concrete solidified awaiting clearance.</li> <li>Ambulances have been delayed.</li> <li>Publications, photos, press meetings.</li> <li>Correspondence is personal property.</li> </ul> <p>Saudis lose respect for us quickly:</p> <ul style="list-style-type: none"> <li>We do not learn the culture.</li> <li>We do not try to learn the language.</li> </ul> | <p>Must keep track of evolution of host country's culture, requirements, and attitude.</p> | <p>Too many employees forward.</p> <p>Saves money.</p> <p>All division chiefs not in same location (F) or (R).</p> <p>Fragmented functional responsibilities.</p> <p>Going to operating division would have helped phase-down.</p> <p>Staff redundancies.</p> <p>Should have come back earlier.</p> <p>Future smaller programs call for HQ at (R).</p> |

Split division appropriate early on, but consolidation to rear should have been earlier.

## PROJECT PLANNING

| Lessons Learned   | Supporting Issues  |
|---|--|
| Project planning should be done by Engineering Division personnel with prior experience in planning and management in overseas environment.                 | <p>It was difficult to plan because USACE did not know what Saudis wanted.</p> <p>USACE engineer designs based on US customs and specs, with insufficient attention to the client's culture and preferences.</p> <p>USACE did a poor job in life support planning, especially in housing.</p> <p>Sometimes we were too optimistic about when projects would be completed.</p> <p>Many technical lessons learned were not incorporated into useful plans and specs. This created the need for numerous change orders.</p> <p>There was no Planning Division--Engineering Division handled all project planning.</p> <p>Did not plan enough time for subsurface exploration and reconnaissance.</p> <p>AE was not required to give lists of spare parts, tools, equipment, etc.--led to disputes on design intent.</p> |
| Organize for project planning so execution plan is internal staff effort or provide command emphasis on following plan.                                     | <p>Project planning must relate to the organization responsible for implementation and execution.</p> <p>Ad hoc planning committees were composed of less than Division/branch chiefs.</p> <p>Project plans were often ignored.</p>  |
| When doing initial planning, be sure to consider all potential interfaces among players (e.g., engineering and construction, construction and contractors). | <p>No effective interrelationship between construction efforts adjacent to one another.</p> <p>Planning could have helped with problem of contractor interface.</p> <p>Many design packages were done entirely in rear with no interface with people in field.</p>   |
| Get the client involved in project planning to hold down changes.   | <p>Saudis did not entirely know what they wanted. Corps had to research everything.</p> <p>Hard to plan when Saudis change their minds so frequently.</p> <p>USACE did well in planning in spite of numerous change orders and modifications.</p> <p>Even when involved, client continued to change project scope throughout project.</p>  |
| Examine the culture and environment to ensure the design reflects the host country.   | <p>Insufficient time was spent on researching client's cultural and environmental background.</p> <p>Corps did not actively involve client in design:</p> <ul style="list-style-type: none"> <li>Host political agencies not involved in design.</li> <li>Cultural considerations not well known/understood.</li> <li>Many projects were under-designed for culture.</li> </ul>  |
| Avoid designing state-of-the-art structures when maintenance will be difficult for customer (or US personnel)--stick with the basics.                       | <p>State-of-the-art designs were used in numerous projects:</p> <ul style="list-style-type: none"> <li>Corps did not adequately address need for top-quality people for O&amp;M of facilities.</li> <li>Saudis did not express concern for O&amp;M.</li> <li>Corps did not emphasize using good solid basic design for structures in Saudi Arabia.</li> </ul>  |
| Investigate geological and environmental conditions thoroughly.   | <p>Harsh geological and environmental conditions:</p> <ul style="list-style-type: none"> <li>Corps lacked thorough geological investigation and soil testing: compaction qualities, moisture content, salt and clay content, etc.</li> <li>Materials used in CONUS not necessarily satisfactory for Middle East.</li> <li>Many materials and designs not suited to this area.</li> </ul>   |

## PROJECT PLANNING--Continued

| Lessons Learned  | Supporting Issues   |
|--|---|
| Investigate availability and delivery capability of materials and parts and plan for contingencies.  | <p>Delays in obtaining materials:</p> <ul style="list-style-type: none"> <li>Using certain US products/materials.</li> <li>Philosophy of "Buy Saudi."</li> <li>Ports clogged--months before ships off-loaded.</li> <li>Timing of deliveries hard to schedule.</li> <li>Spare parts not stocked in-country.</li> </ul> <p>Many "Saudi" products and materials are not local, were purchased through Saudi middlemen from all over the world--resulted in long delays.</p>  |
| Plan to use locally obtained products and materials early in the program.  | <p>Corps pressured to "Buy Saudi!"</p> <ul style="list-style-type: none"> <li>Products and materials were good quality.</li> <li>Must allow for non-US specs if materials are good quality.</li> <li>Contractors are better off buying from local market.</li> <li>Sole source was specified but not necessary.</li> <li>US specs used but not necessary.</li> <li>Now have SOGS.</li> <li>Eliminates extra staffing; reduces cost and delays.</li> <li>Dramatic availability of products and materials from local suppliers.</li> <li>USACE late on accepting "Buy Saudi" philosophy.</li> </ul>               |
| Create cross-reference guide to relate US specs and regs with those of client or host country.   | <p>USACE materials need to be keyed to international products.</p> <p>Difficult to match DIN to US standard.</p> <p>Saudi materials did not meet US specs.</p>  |
| Emphasize standardized design of component elements (e.g., pre-cast panels) as well as entire units (e.g., housing units).   | <p>Corps did not emphasize standardization--allowed over 1700 different shapes of architectural concrete when only 100 to 200 would have sufficed.</p>  |
| Emphasize the value engineering program and have a value engineering officer working at the design stage.  | <p>Value engineering has not been emphasized as much overseas as in USA. Contractors in Saudi are not familiar with value engineering.</p>  |
| Pinpoint and rectify design problems early; i.e., review more thoroughly and research environment more thoroughly.   | <p>Quality control of design was poor:</p> <ul style="list-style-type: none"> <li>Tight time schedules created design deficiencies.</li> <li>Corps did not give enough definition and guidance to AE.</li> <li>Review process was not thorough nor complete.</li> <li>Far too many oversights in designs released to field.</li> <li>Resulted in numerous change orders.</li> <li>Insufficient time was spent on foundations research and testing.</li> <li>AE was not knowledgeable enough in Saudi conditions.</li> <li>Storm drainage was inadequate.</li> <li>Soils testing proved insufficient.</li> </ul> |
| Look closely at how contracts are divided.   | <p>When projects are cut up vertically (i.e., subsurface, roads, and structures), it is more difficult to pinpoint responsibility when a structure or system fails.</p> <p>If one contract covers more than one site (even where jobs are similar), it is very difficult to monitor and close out a contract--more smaller contracts are better even where same contractor is involved.</p> <p>If sequencing of contracts is not carefully considered, progress can be delayed and it can be difficult to pinpoint responsibility for a failure.</p>  |
| Each contract should be clearly written and carefully cross-checked--it pays off during construction and contract closeout. Check for consistency in specifications and engineering clauses. | <p>Many contracts are a mixture of both design and performance specifications--this led to problems.</p> <p>Engineering clauses sloppy--details not checked throughout.</p> <p>MED followed applicable contracting regs, except Saudi set-asides.</p>   |

## PROJECT PLANNING--Continued

| Lessons Learned   | Supporting Issues  |
|---|--|
| Contract should include maintenance and parts clause.   | Maintenance and parts are a problem when buying material/equipment for a construction program 10,000 miles away.   |
| Fixed fee contracts are preferable where project is clearly defined.  | Most USACE employees prefer fixed fee contracts.<br>If program scope is vague/changing, it would be better to go with fixed price contracts for much smaller pieces as organization becomes able to define them. The alternative is to go for CPAF contracts which tend to cost more and require more monitoring. Thus, it might be best to develop contracts as scope unfolds.  |
| CPAF contracts should only be used where:<br>Project is not defined.<br>Staff is available to monitor closely throughout.<br>Someone is familiar with them.                         | Contract type depended on the kind of work, what was driving the contract (i.e., time). CPAF worked best when scope of work could not be defined yet needed to get underway. USACE tried to go with a competitive fixed price within a defined scope of work.<br>Management of CPAF contracts was inadequate and led to embarrassing costs.<br>CPAF contracts take large staffs to monitor--USACE has no CPAF experts. |
| Use of RFP contracts proved more effective than awards to lowest bidder.  | Awards to low bidders has led to trouble--scrimping.<br>Used RFP contracts which were seldom negotiated.   |
| Contractor prequalification process should screen for prior work quality as well as previous experience and adequate organizational size.   | Difficult to prequalify construction contractors from MED (R).<br>Some poor performing contractors received follow-on work.  |
| Contractor prequalification at MED (R) provides buffer versus customer pressure to select favored companies.  | Better contractor selection in early days when more flexible and less involvement by DGMW and MODA and less participation by local contractors. DGMW has gained influence in selection process.  |
| Provide contractors with project materials and equipment standardization guide to promote standardization within the program.   | Standardization of project materials:<br>Lack of quality assurance/quality control in construction materials.<br>Project materials were not controlled.<br>Too many options in materials.<br>US regulations preclude specifying manufacturers--result is no standardization and maintenance problems.<br>When USACE serves as prime contractor, it sometimes provides materials to subcontractors.                     |
| Have a person knowledgeable about the project design on site during construction to approve changes and clarify questions (could even be a representative of AE design contractor). | Due to distance between elements, there has been far too little coordination between engineering and construction:<br>Cannot always determine intent of design.<br>Cannot easily obtain timely clarifications.<br>Established engineer element forward to coordinate engineering questions between (F) and (R).  |
| Build prototypes early when dealing with a customer that has difficulty conceptualizing the final product from designs especially when there will be several similar structures.    | Corps did not begin building prototypes early enough in the program. This resulted in change orders.   |
| Be more aggressive in collecting and sharing lessons learned about design problems to avoid repeating mistakes.   | Same errors were carried to other designs: "lessons learned" was not being disseminated and/or not being used.   |
| Overall, engineer design was good.  | Many consider quality of design excellent. Hired some of best AE talent in the world.  |

## CONSTRUCTION

| Lessons Learned  | Supporting Issues   |
|--|---|
| Early on, be aware of other countries' policies on security; design and execute construction projects accordingly. | <p>Saudis do not want publicity in their military construction program.</p> <p>Security has not been a primary concern to the USACE in design of facilities.</p> <p>Saudis are very security conscious.</p> <p>Despite Saudi efforts to keep construction project details confidential, US laws require public advertising in CBD for proposals and bids.</p> <p>Saudis require all plans, blueprints, etc. be safeguarded.</p> <p>USACE told not to photograph specific things during and after construction.</p> <p>Living/working compounds are very secure—sometimes too secure.</p> <p>Security badges and ID cards required for all projects.</p> <p>Over-cautious screening of personnel and equipment.</p> <p>Aerial photos for construction prohibited at first.</p> <p>USACE cannot take design/construction files off base.</p> <p>Much equipment/property is subject to whims of officials/inspectors.</p>  |
| Keep construction management in-house.   | <p>Experience in construction management got better with time.</p> <p>Contractor construction management was not as good as Corps management.</p> <p>Construction management done almost exclusively in-house:</p> <p style="padding-left: 20px;">Title II overpaid and not as qualified as USACE personnel.</p> <p style="padding-left: 20px;">USACE personnel do better job for less pay.</p> <p style="padding-left: 20px;">District-managed construction contracts are good; ELC-managed construction contracts are very poor.</p> <p style="padding-left: 20px;">More control over construction management if done in-house.</p> <p style="padding-left: 20px;">Corps construction managers in Saudi do not manage resources/assets as they would in the USA (personnel, high grades, labor laws, etc.).</p> <p>USACE is a good construction management organization.</p> <p>Too often the Corps spent much time educating contractors on construction and contract management.</p> <p>Saudis had entirely different view of contract management. They do not understand our regs and policy; they think we are too easy on contractors.</p> <p>Many good foreign and US contractors evolved as a result of the USACE work in the Middle East.</p> |
| USACE did a poor job in GFP, lost credibility with its clients. Three options for future:                          | <p>Tracking system never effectively worked.</p> <p>Poor financial records were kept.</p> <p>Material often arrived too early or too late.</p> <p>Material damaged in shipment and at customs.</p> <p>Packing lists often inaccurate.</p> <p>Material often did not meet specifications.</p> <p>No management emphasis on GFP.</p> <p>No central control of GFP.</p> <p>Lacked coordination among engineering, construction, and procurement.</p> <p>In reactive mode to problems.</p> <p>No GFP in planning stage.</p> <p>ELC staff is too small with too few expert logisticians misplaced in organizational structure; got responsibility for GFP too late.</p>  |
| Stay out of GFP. Leave it to the experts.  | ELC staff too small with too few expert logisticians.   |
| Monitor large items; let contractor monitor smaller items.   | <p>Contractor has a sense of urgency about furnished property that USACE does not.</p> <p>Contractor can do furnished property cheaper:</p> <p style="padding-left: 20px;">Fewer legal constraints</p> <p style="padding-left: 20px;">Less bureaucratic constraints.</p>  |
| Get expertise and do it right, especially tracking.  | <p>ELC staff too small with too few expert logisticians.</p> <p>Tracking system never effectively worked.</p>   |

## CONSTRUCTION--Continued

| Lessons Learned  | Supporting Issues   |
|--|---|
| Hire enough construction management people at beginning of program.  | Construction management staffed too late in program. Projects have been exceptionally large and complex. Essential to get the best people available early in program.   |
| Be sure to have enough key USACE construction personnel who have management background.                                    | It is mandatory for district engineers to have a strong construction and contract management background. There was a lack of supervision of construction personnel.   |
| Put enough construction management people in the field to oversee the job--make sure they are capable and know what to do. | Corps had more people on paper management and not enough on field supervision. Frequently very short-handed in construction management personnel. (Had to work 14 hours/day, 7 days/week.) Personnel turnover was extremely high with contract management personnel. There were no detailed sets of SOPs outlining contract managers' responsibilities for each field office position. There has been no overlap of personnel assignments to provide continuity. Construction personnel had insufficient skills in foundations and geotechnical areas. Construction management involved putting out too many fires. |
| Give field personnel the management authority they require to do their jobs well.  | Field personnel are given responsibility but no corresponding authority in their job.   |
| Get safety officer in-country and on job early.  | No safety program initially. Safety officer late coming on board.   |
| Take US citizen translators with us to remote areas when requiring language translation.                                   | Locally hired translators tend to inject their own Middle East thinking into their translations--this does not help the interests of USACE and casts doubts on where their loyalties lie.   |
| Proper staffing levels, consolidated procedures, and management support make for better quality assurance/quality control. | Understaffed, spread too thin. Good quality assurance for limited number of people. Duplication of quality assurance between divisions and districts. Quality control improved as program matured. Provisions for testing inadequate. Top management involved and interested: aggressively required strong quality assurance program. Constant problems plagued project (foundations, soil, design, materials).   |
| Use a network analysis system to monitor construction.   | Needed to use computers more often to keep up with contractors.   |
| Communication through workshops and report books diminishes recurring problems.  | Quality assurance workshops create more job effectiveness.  |
| Emphasis on safety = results.  | Very good and improving record (improved when safety officer on board)<br>Visibility on site.<br>Safety requirement in job descriptions.<br>Awards program.<br>Management interest.<br>Orientations required since many employees were from other agencies.<br>Harsh environment increases safety problems: heat, aridity, exaggerated health hazards, inferior medical care, water quality, and driving hazards.<br>Safety is expensive--no financial incentive.   |

## CONSTRUCTION--Continued

| Lessons Learned  | Supporting Issues  |
|--|--|
| <p>Training foreign-speaking contractors with differing cultural backgrounds is time consuming but necessary.</p>  | <p>Always training foreign contractors and new USACE personnel about USACE quality assurance procedures.<br/>           Language barriers.<br/>           Good quality assurance/quality control correlates to effectiveness of contractor--lots of good Korean contractors.<br/>           Contractor perception that good quality control costs more money, so good quality control people often are replaced.</p>   |
| <p>Unique multi-national workforce poses safety problems that require special approach:<br/>           Bridge language barrier.<br/>           Educate as to USACE expectations/processes.<br/>           Acknowledge accomplishment.<br/>           Counteract avoidance or defiance (establishing cross-checks to uncover accidents contractors hide).</p> | <p style="text-align: center;"><u>Saudi</u></p> <p>Contractors and TCNs hired by contractor unfamiliar with US safety standards:<br/>           Language barriers.<br/>           Cultural differences; i.e., value of life, dress conventions.<br/>           Many USACE project managers question need for vigorous safety program which imposes US values on other cultures.<br/>           Many USACE project managers question need for vigorous safety program which imposes US values on other cultures.<br/>           Contractors try to hide accidents.<br/>           Some contractors (especially Koreans) want to please:<br/>               Need to know how.<br/>               Need recognition for accomplishment; e.g. quarterly awards.</p> |
|  | <p style="text-align: center;"><u>Other Middle East Countries</u></p> <p>Good program 1st year of placement, 2d year rate climbed due to increased volume placement. Ridicule and defiance common.</p>   |

## SUMMARY OF PROGRAM EVALUATIONS

| Lessons Learned  | Supporting Issues   |
|--|---|
| <u>Career Development</u>  |   |
| <p>USACE organization gained far more than it lost in terms of workforce development.</p> <p>USACE personnel benefitted from MED, Saudi experience.</p> <p>Some individuals suffer temporary setbacks despite career enhancing opportunity.</p>  | <p><u>USACE--Pros</u></p> <p>E&amp;C communication improved.<br/>Experience transferable to future international projects (Sinal, Oman, etc.).<br/>Enhanced capability in engineering, construction, P&amp;S, personnel management.<br/>New blood throughout USACE due to forced mobility on return.<br/>Prepares key leaders for positions at district, division, &amp; OCE.</p> <p><u>USACE--Cons</u></p> <p>Experience may not help divisions or districts.<br/>Fast promotion = experience gaps.<br/>Individuals benefit greater than USACE (may lose many good employees on return due to not placing them well).</p> <p>Rapid promotion.<br/>Broad, challenging work.<br/>Magnitude.<br/>Material.<br/>Pace.<br/>International.<br/>Benefit and opportunity for young.<br/>Opportunity for engineering and construction cross-training.<br/>Monetary benefits.</p> <p>Left off mainstream:<br/>Attorney.<br/>P&amp;S.<br/>Logistics.<br/>Fast promotion = some gaps.<br/>MC personnel benefit more than CW personnel.<br/>USACE minimum assistance on return:<br/>Likely downgrade.<br/>Job hunt difficult from overseas.<br/>Some forced into career shifts.</p> |
|  |   |
|  |   |
| <u>Organizational Vitality/Responsiveness</u>  |   |
| <p>USACE has proven it can take on a project of this type successfully.</p> <p>USACE is flexible and responsive and has a workforce willing to take on projects like Saudi.</p>  | <p>Successfully developed unique procedures to get job done--proved innovative capability.<br/>Organization has proved that it can accommodate distances between design and placement.<br/>Oman project showed USACE's ability to react to an overseas military construction program on short notice when at a disadvantage in knowledge and distance from a project.</p> <p>Good combination of the best of military and civilian workforce.<br/>No problem quickly sending people to other projects when they have a pool of people with experience and visas, shots, passports, etc.<br/>This kind of program attracts people looking for challenges.<br/>Program like Saudi attracts vital, responsive people that tend to stimulate those at home.<br/>USACE was able to pull the talent it needed from within (a sign of vitality).</p>   |
| <u>National Interests</u>  |   |
| <p>When performed well, USACE construction overseas can be in national interest if they:</p> <p>Support friendly military forces.<br/>Support US military posture.<br/>Provide a US presence in a strategically located world area.<br/>Are agreeable and beneficial to client nation.<br/>Help US economy.<br/>Provide experience for future efforts.</p> | <p>USACE construction program:</p> <p>Supports friendly military forces.<br/>Supports US military posture.<br/>Promotes US-Saudi political relationship:<br/>Saudi strategically located and playing bigger role in Middle East peace process.<br/>Saudis want to keep us there.<br/>Helped get Saudi to hold down oil production.<br/>Helped US economy.<br/>Provided experience for future efforts.<br/>National interests difficult to recognize.</p>  |

LAST PAGE OF ANNEX D



ANNEX E

STUDY REVIEW COMMENTS

## ANNEX E

### STUDY REVIEW COMMENTS

1. Purpose. At the completion of this study, ESC published a draft report that was distributed for review and comment by the study sponsor, selected organizational elements within the sponsoring command, and key USACE HQ officials. The purpose of this annex is to present the results of that review process.

2. Scope. This annex presents only the significant and substantive comments ESC received on the draft report. (No editorial comments are included since they were automatically included in the final report, either in response to the review comments or as part of ESC's routine editorial process.) All comments are listed according to who provided the input. Following each comment is a description of the action ESC took as a result of the comment.

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NOTE: Page and paragraph references have been revised to correspond to comment location in this final published version, rather than as originally submitted by reviewers who had keyed their comments to the draft version.

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

Transmittal Letter,  
Paragraph 1

Comment: If possible the format of the final should have data and narrative discussing it on the same or facing page.

Response: When the final version is prepared for publication, ESC's production staff will review the document layout to ensure that tabular or graphic material is located as closely as possible to its explanatory text.

14, 6b

Comment: Recommend that the essence of the following two points be included in the narrative: Establish a Planning Team.

Planning of a project must relate to the organization responsible for implementation and execution of the project. Within MED, each staff element involved in the project attempted to "plan" its own activities. However, for the overall project plan(s), ad hoc committees were formed consisting of various members of the individual staff elements. For the most part the committee members were not Division or Branch Chiefs and approval of the final project plan was largely perfunctory. Command emphasis was given on the implementation of the planning; its execution was essentially voluntary. Oftentimes, the plan was simply ignored. The lessons learned therefore is to either organize so that an execution plan is an internal staff effort and not that of an outside group on a temporary mission, or to provide command direction on following it. In this instance, a directorate organization might have been considered for each major project.

Project planning was also significantly affected by the customer who was generally unwilling to acknowledge prior decisions on project scope, siting, standards, and criteria. Lacking any internal standards regarding the composition of projects,

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

14, 6b--Continued

Comment: guidance furnished to MED was that of individual opinion and generally formed at that point in time. Project scope (and cost) invariably grew at each customer review or interface. It was not possible to establish a realistic project scope and cost budget. The client was involved in the initial stages of all of the projects. However, this did not preclude the continued changes that he made throughout the planning, design and construction phases. Accordingly, project planning was extremely difficult.

Response: The essence of these remarks has been included in Annexes C (C-16) and D (D-8). The sponsor had suggested including these statements on page 14 as a part of a major program planning lesson. As these remarks pertain to project planning, they have been included at the appropriate places in Annexes C and D.

16, 6d

Comment: Recommend that these corrections and thoughts be incorporated into the narrative.

The Engineering Planning and Liaison Office (EPLO) was formed in 1976 as part of the basic MED organization, not in 1980 as stated. More recently (circa 1981/82) the EPLO was decentralized and split up to include two organizations which were located at the Al Batin and Riyadh District Offices as well as at the Division Office in Riyadh. The more appropriate comment therefore is that locating them at the District Offices (construction sites) should have occurred earlier since the conclusion is that this arrangement was more successful.

Do not believe that the recommendation of having an AE design contract representative at the construction site is "popular" as

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## I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

16, 6d--Continued

Comment: stated - or even workable considering various agency responsibilities and contracting problems. This borders on personal services and assumes the AE rep can speak authoritatively for the AE firm and Engineering Division.

Response: These comments were used as the basis for revising paragraph 6d. Starting with the 15th line of this paragraph, the text was changed to read "This problem occurred despite 1976 formation of the EPLO--an engineering element forward--to preclude such problems. In the early 80s (1981/82), MED decentralized and split up EPLO into three elements, locating them at Al Batin and Riyadh District Offices as well as the Division Office in Riyadh. This more decentralized arrangement seems to have worked fairly well and probably should have occurred earlier. Most concerned personnel endorsed this as a desirable arrangement for future overseas programs. One alternate recommendation, along these same lines, is to have a representative of the AE design contractor (under supervision of Engineering Division) onsite to answer design questions or resolve design problems.

17, 6e

Comment: Recommend that "avoid incremental funding" be dropped or refocused based on the paragraph following:

The subject is not proper or major lesson learned. Incremental funding by the host (or US) government is not within the CE area of responsibility and we cannot truly influence this eventuality. While it is agreed to be burdensome, most governments fund their projects on a fiscal year basis. Incremental funding is a fact-of-life which the CE can and does and must accommodate. Even so, the EAA and the financial arrangements specified therein will probably never

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

17, 6e--Continued

Comment: be repeated with any other foreign government. Future non-MILCON foreign government construction projects will be authorized and funded under FMS procedures which in theory will eliminate the incremental funding problem encountered in Saudi Arabia.

Response: Avoid incremental funding has been deleted as a major lesson learned. The relevant insights were relocated to a lower level of lesson learned. This was done by revising pages C-5 and D-6 to say "Avoid incremental funding where more frequent than two times/year."

18, 6g

Comment: "Provide adequate communications capability" provides a reasonably accurate, simplistic overview of the unique problems and solutions employed by MED. There are, however, several points which require clarification, expansion, and correction.

The satellite lines are leased at a cost of \$900K+ a year. There are and have always been four lines: 1-data only; 1-voice only; and 2-voice/data. They do not provide "direct phone hook-ups" but act as trunks between CONUS and Saudi Arabia. They hook together two switching centers which enable users throughout CONUS and Saudi Arabia to access each other.

There is not a single facsimile transmitter but rather a net of low and high speed facsimile transceivers. High speed record traffic is provided among MED(R); Omaha, Nebraska; OCE; MED(F), Al Batin, and Oman. Low speed traffic sites are MED(F), Al Khobar, Khamis, Taif and Jeddah. Their use has significantly reduced commercial TELEX charges and provides a new dimension in message/data handling.

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

18, 6g--Continued

Comment: The import and utilization of all types of radio equipment has been a source of continual conflict within MED and with the host government.

The initial heavy expenditures for radio equipment were totally justified. At the start of the program, commercial long haul and local telephone services were almost non-existent. High frequency voice and Radio Teletype were the sole links between MED(F) and Tabuk, Khamis, RAM and Al Batin. In Riyadh, CB and UHF radios were used in place of villa telephones. Although the majority of equipment is no longer required it has reached or exceeded its life expectancy. Even with the great increases in commercial telephone service since 1976, there still remains a requirement to operate radio communications. This is especially true for Emergency Operations. A repetition of the Mecca incident would render MED sites isolated as all telephone service would be cut. Finally, there are no large amounts of expensive communications equipment in storage and unused. Any surplus equipment is being disposed of through Property Disposal actions with some value accruing to MED or is turned over to the Saudi Government through GDMW.

The EAA authorized MED and contractors to establish intra and inter site radio nets. The host government is required to provide frequencies. When the program began, there was no central host government agency to control and allocate frequencies. When PTT assumed this responsibility they would not approve frequencies for MED. The frequencies in use although not officially approved, were not interfered with. There have been three formal requests in 1980, 1981 and 1983 to receive authorization per the EAA. In each case the request was not acted on by GDMW. The oppositions to radio

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

18, 6g--Continued

Comment:

communication by the Saudis stated in the study can only be considered as secondary or tertiary. The primary opposition is internal security. Radios are viewed as a means of command and control which in the wrong hands could constitute a real threat to any Government. The Saudis are fully aware of MED's unauthorized systems. They use them, and have accepted the transfers of some equipment at the time of site closeout. Failure to legalize and officially recognize the radio systems leaves the host government the perceived capability to quickly shut them down without recourse on the part of MED. In fact the proliferation of systems would preclude any immediate and complete loss of communications.

The inclusion of different working days and hours as communications problem is not valid. Satisfactory phone connections can be made at any time. The time could have been expanded by the use of flex time or other administrative measures. A review of telephone log sheets indicates that a substantial amount of business is conducted after 1630 and on Thursdays and Fridays between MED(F) and MED(R).

The lack of commercial phone lines at work sites in Oman is attributed to the lack of PTT infrastructure. The work load does not support the purchase and installation of an extended High Frequency voice and record traffic network.

Although not mentioned, the MED microwave system in Riyadh should be highlighted. Driven by the physical layout of compounds and the non-availability of sufficient telephone cable repair in any single location, the use of MED owned and maintained microwave shots enabled MED to manage scarce assets and develop an internal



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## I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

18, 6g--Continued

Comment: system not dependent of local conditions. The use since 1976 of microwave in this manner is considered a revolutionary concept today by many large CONUS based corporations.

In order to properly integrate the lesson learned for adequate communications capability in isolated developing areas, primary steps must be taken.

Include technical communications experts early on in planning. They should make the determinations as to the best systems to support the user.

Users must be able to define their requirements for communications. They must temper their requests based on mission requirements, equipment costs and host country constraints.

Host country agreements must include approvals for communications. When granted they must be actively pursued to insure that licenses and frequencies are on hand prior to starting a project.

Equipment must be standardized. All equipment to include telephone PBXs, radios, facsimile and data should be compatible with existing systems. This will allow for transfers between locations and availability of repair parts.

Specialized support by contractor is essential. Although costly, the on-call availability of dedicated contract maintenance personnel is essential.

Response: Paragraph 6g was almost completely revised to be more specific and accurate as regards the details of the communications network. The revised paragraph segments are presented below; they now reflect the study

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## I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

18, 6g--Continued

Response: sponsor's input. The revisions begin with the third sentence of the paragraph:

"But, based on the evolution of the communications capability in Saudi Arabia and on similar experience in Oman, it appears that this fundamental capability must be created early in a program: include technical communications experts early on in planning to determine the best systems; have users define their communications needs considering mission needs, equipment costs, and host-country constraints; make sure host-country agreements include approvals for communications and issuance of licenses and frequencies before starting a project; standardize communications network elements to be compatible with existing systems to ensure availability of parts and dedicated maintenance personnel.

"(1) The communications capability between MED (R) and MED (F) was definitely inadequate when the Saudi program began. After four satellite lines were leased (one data-only, one voice-only, two voice-and-data), the situation improved dramatically. Saudi program efficiency improved further as ADP equipment and a net of low- and high-speed facsimile transmitters joined the communications network. Of course, there still are problems. The EAA authorized MED and contractors to establish intrasite and intersite radio nets and required the host government to provide frequencies. Initially, the Saudis had no central agency to control and allocate frequencies. When PTT assumed this responsibility, they would not approve frequencies for MED. GDMW has acted on none of MED's formal requests (1980, 1981, and 1983) for authorization per the EAA. The Saudis are fully aware of MED's unauthorized systems, but have not interfered with them. They are viewed as a means of command and control which in the

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

18, 6g--Continued

Response: wrong hands could constitute a real threat to their government. Failure to legalize the radio systems leaves the Saudis a perceived capability to quickly shut them down without MED recourse. Despite the increased commercial telephone service since 1976, there still remains a requirement for MED to operate radio communications, especially for Emergency Operations, to preclude MED sites being isolated due to failure or cutting of all telephone service. Construction efficiency, safety, and costs are also affected by the availability or nonavailability of radio communications between work sites and area and resident offices. A MED-owned and maintained microwave system in Riyadh enables MED to compensate for insufficient telephone cable and to be independent of local conditions.

"(2) In Oman, commercial telephone lines are being used because program traffic does not justify the expense of dedicated lines for high frequency voice and record traffic. Thus, each call is very costly. Although USACE employees in Oman need more commercial lines at area offices, the PTT infrastructure cannot provide them. This communication problem in Oman is complicated by the lack of an APO. Thus, mail must be sent through the diplomatic pouch and might take 2 to 4 weeks.

"(3) Because of the primitive state of communications at the outset of the Saudi program, the communications network had to evolve--going through several phases to get to an adequate level. Apparently, the situation in Oman is similar, although the program size and duration may not justify the development of a communications network anything like the sophisticated one that exists today in Saudi Arabia."

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

21, 61

Comment: The question of the necessity of the Ras Al Mishab Port is rhetorical and should be deleted. When the port was authorized it was definitely needed to avoid a 120-150 day ship waiting period at the Dhahran Port which existed at that time. In addition, MODA wanted a dedicated port under its own control and for its own use.

Response: The comment has been deleted.

21, 61  
C-8; D-8

Comment: There are misleading comments that the construction contracts for Saudi Arabia contained CONUS clauses that were not necessary for Saudi Arabia and could have been deleted. There were many years of refinement and redrafting of clauses by all elements of the staff to make the contract clauses appropriate to Saudi Arabia. Many clauses could not be eliminated because they were mandated by law, though these clauses were inappropriate to Saudi Arabia and in some cases even bizarre, they were the dictates of applicable American law and could not be modified to conform to the realities of the local situation. Any clause that could be changed, waived or eliminated as inapplicable was changed or altered. It has always been American policy to export our socioeconomic objectives whether appropriate or not and to insinuate that such policy could be altered in the future if the lessons learned were misleading. Our administration must learn to work within the perimeters of American policy, even if that policy is totally inappropriate or even burdensome and costly in the offshore situation.

While more could possibly have been done with a much higher level of interest, changes were vigorously pursued and we continue to pursue the resolution of obvious conflicts. Recommend that this information

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I. SPONSORING COMMAND COMMENTS

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Reference Page/  
Paragraph

21, 61  
C-8; D-8--Continued

Comment: be considered in revising appropriate comments.

Response: These phrases were deleted from pages C-8 and D-8, but page 21 was left unchanged because the phrase "US standards were used in contracts when not necessary--need a system to cross reference US standards to international standards on international contracts" refers to standards of weights, measures, and materials rather than to the socioeconomic clauses which were the thrust of the sponsor's recommendations.

22, 61

Comment: The wording in the last sentence of the narrative regarding contractor O&M is conjectural on the part of the author and should be deleted. Construction contractors have been used for O&M, but as a last resort. It is not their primary mission and it is usually not cost effective to use them in this role. The lesson learned is to attempt to early educate the customer on the need for an O&M organization that can accept the completed project, to plan accordingly, and to be prepared for this not happening.

Response: This sentence has been revised to accommodate the sponsor's concern. It now reads, "The customer needs to be educated as to the need for an O&M organization that can accept the completed project. The construction contractor needs to be required to provide an adequate supply of spare parts. Such actions help relieve USACE of the necessity to deal with these lingering and inevitable O&M problems which are associated with construction programs."

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## II. FORMER COMMANDING OFFICER COMMENTS

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Reference Page/  
Paragraph

C-3, D-3, D-7

Comment: BG George R. Robertson, former Commanding Officer, MED, and the individual who requested this ESC study, met with the study team to personally review the draft. His only substantive concern was that the study should give more emphasis to the "split division" issue--especially as it stands today. Now that the program has geared up, matured, and evolved into a more smoothly phased operation, he believes the Division can now operate out of its CONUS HQ. He indicated a strong wish to give this point higher visibility. He indicated that the flag could have been brought back earlier and that consolidation was possible earlier. From this point on, he believes that projects in the Middle East and other overseas areas can be handled as district or area office operations under a CONUS-based HQ.

Response: Having deleted one of the original 12 key lessons learned as a result of the MED review process, it seemed appropriate to elevate one of the remaining lessons learned to this more visible status. We reviewed all the lessons learned which had not been identified as key, along with their supporting issues. On finding that several supporting issues on pages C-3 and D-3 supported BG Robertson's concerns (as well as those issues with which they had already been clustered), we created a new lesson learned to address this issue directly. A further review of the narrative interview files revealed that this point had been brought up repeatedly by several MED employees. Thus, we have written a paragraph discussing this key lesson and inserted it as paragraph 6e. We have also revised pages C-3 and D-7 to contain one additional lesson learned which focuses on the new lesson. Supporting issues were drawn from the interview narratives as they had been for all other lessons learned.

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LAST PAGE OF STUDY

**END**

**FILMED**

**2-85**

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